z/OS

DFSMSdfp Diagnosis Guide

GY27-7617-01

z/OS

DFSMSdfp Diagnosis Guide

GY27-7617-01

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This edition applies to Version 1 Release 3 of z/OS™ (5694-A01) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces GY27-7617-01.

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About This Book

This book helps the system programmer identify, describe, report, and resolve failures in all components and subcomponents of DFSMSdfp™. The book is organized by subcomponent. Please refer to the table of components, Table 22 on page 89, for a list of major components and associated subcomponents. *z/OS DFSMSdfp Diagnosis Reference*, GY27-7618, helps you gather additional failure-related data. This data might be needed by the IBM® Support Center if a search of the IBM software support database for an identical, previously reported failure proves unsuccessful.

This book directs you through a step-by-step procedure to help you build a string of standard keywords that describe most programming failures. Catalog and SMS types-of-failure and *some* message types-of-failure provide documentation containing a complete failure symptom string, eliminating the need for you to build one. You can use the keyword string to search an IBM software support database such as the Software Support Facility (SSF), Info/System, or ServiceLink to determine whether an Authorized Program Analysis Report (APAR) already documents your problem. If an APAR already exists, its text might contain the information required to resolve the problem. The resolution could be in any of the following forms:

- An APAR fix
- A Program Temporary Fix (PTF)
- A bypass

If an APAR does not yet exist, IBM Support Center personnel might request that you gather additional failure-related information. This could require using software traps or traces.

Wherever possible, this guide directs you along a keyword-build path common to all DFSMSdfp subcomponents. Any subcomponent that requires component-specific activity leaves the common path to perform that activity and then returns.

Required Product Knowledge

To use this book effectively, you should be familiar with the following subjects:

- IBM Support and how it is structured
- Basic dump analysis
- Diagnostic techniques

Related Reading: For information on these topics, refer to *z/OS MVS Diagnosis: Procedures*, *z/OS MVS Diagnosis: Reference*, and *z/OS MVS Diagnosis: Tools and Service Aids*.

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Referenced Publications

This book refers to the following publications:

Publication Title	Order Number
Device Support Facilities User's Guide and Reference	GC35-0033
SMP/E Reference	SA22-7772
z/OS DFSMS Access Method Services	SC26-7394
z/OS DFSMSdfp Diagnosis Reference	GY27-7618
z/OS DFSMSdfp Utilities	SC26-7414
z/OS DFSMSdss Diagnosis Guide	LY35-0116
z/OS DFSMShsm Diagnosis Guide	LY35-0114
z/OS DFSMSrmm Diagnosis Guide	SY27-7619
z/OS DFSMS: Using Data Sets	SC26-7410
EREP User's Guide	GC35-0151
z/OS ISPF Messages and Codes	SC34-4815
z/OS MVS IPCS User's Guide	SA22-7596
z/OS MVS Diagnosis: Procedures	GA22-7587
z/OS MVS Diagnosis: Reference	GA22-7588
z/OS MVS Diagnosis: Tools and Service Aids	GA22-7589
z/OS MVS System Codes	SA22-7626
z/OS MVS System Commands	SA22-7627
z/OS MVS Programming: Authorized Assembler Services Guide	SA22-7608
z/OS MVS Programming: Authorized Assembler Services Reference ALE-DYN	SA22-7609
z/OS MVS Programming: Authorized Assembler Services Reference ENF-IXG	SA22-7610
z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO	SA22-7612
z/OS MVS System Messages, Vol 1 (ABA-AOM)	SA22-7631
z/OS MVS System Messages, Vol 2 (ARC-ASA)	SA22-7632
z/OS MVS System Messages, Vol 3 (ASB-BPX)	SA22-7633
z/OS MVS System Messages, Vol 4 (CBD-DMO)	SA22-7634
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z/OS MVS System Messages, Vol 7 (IEB-IEE)	SA22-7637
z/OS MVS System Messages, Vol 8 (IEF-IGD)	SA22-7638
z/OS MVS System Messages, Vol 9 (IGF-IWM)	SA22-7639
z/OS MVS System Messages, Vol 10 (IXC-IZP)	SA22-7640
z/OS TSO/E Command Reference	SA22-7782

Accessing z/OS DFSMS Books on the Internet

In addition to making softcopy books available on CD-ROM, IBM provides access to unlicensed z/OS softcopy books on the Internet. To find z/OS books on the Internet, first go to the z/OS home page: http://www.ibm.com/servers/eserver/zseries/zos

From this Web site, you can link directly to the z/OS softcopy books by selecting the Library icon. You can also link to IBM Direct to order hardcopy books.

Using LookAt to look up message explanations

LookAt is an online facility that allows you to look up explanations for z/OS messages, system abends, and some codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can access LookAt from the Internet at:

`http://www.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/lookat.html`

or from anywhere in z/OS where you can access a TSO command line (for example, TSO prompt, ISPF, z/OS UNIX System Services running OMVS).

To find a message explanation on the Internet, go to the LookAt Web site and simply enter the message identifier (for example, `IAT1836` or `IAT*`). You can select a specific release to narrow your search. You can also download code from the *z/OS Collection*, SK3T-4269 and the LookAt Web site so you can access LookAt from a PalmPilot (Palm VIIx suggested).

To use LookAt as a TSO command, you must have LookAt installed on your host system. You can obtain the LookAt code for TSO from a disk on your *z/OS Collection*, SK3T-4269 or from the LookAt Web site. To obtain the code from the LookAt Web site, do the following:

1. Go to http://www.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/lookat.html.
2. Click the **News** button.
3. Scroll to **Download LookAt Code for TSO and VM.**
4. Click the ftp link, which will take you to a list of operating systems. Select the appropriate operating system. Then select the appropriate release.
5. Find the **lookat.me** file and follow its detailed instructions.

To find a message explanation from a TSO command line, simply enter: **lookat** *message-id*. LookAt will display the message explanation for the message requested.

Note: Some messages have information in more than one book. For example, IEC192I has routing and descriptor codes listed in *z/OS MVS Routing and Descriptor Codes*. For such messages, LookAt prompts you to choose which book to open.

Accessing Licensed Books on the Web

z/OS licensed documentation in PDF format is available on the Internet at the IBM Resource Link Web site at:

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2. Click on **Library**.
3. Click on **zSeries**.
4. Click on **Software**.
5. Click on **z/OS**.
6. Access the licensed book by selecting the appropriate element.

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Your feedback is important in helping to provide the most accurate and high-quality information. If you have any comments about this book or any other DFSMS documentation, you can send them in either of the following ways:

- Send your comments by electronic mail (e-mail) to:
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  - IBMLink from Canada: STARPUBS at TORIBM
  - IBM Mail Exchange: USIB3VVD at IBMMAIL
  - Internet: starpubs@us.ibm.com

  Be sure to include the name and part number of the book, the version and product name, and if applicable, the specific location of the text on which you are commenting (for example, a page number or a table number).
- Fill out one of the forms at the back of this book and return it by mail or by giving it to an IBM representative. If the form has been removed, address your comments to IBM Corporation, RCF Processing Department M86/050, 5600 Cottle Road, San Jose, California 95193-0001, U.S.A.

Summary of Changes

This book contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

You might notice changes in the style and structure of some content in this book—for example, headings that use uppercase for the first letter of initial words only or procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our books.

Summary of Changes for GY27-7617-01 z/OS Version 1 Release 3

This book contains information previously presented in *z/OS Version 1 Release 1 DFSMSdfp Diagnosis Guide* (GY27-7617-00).

The following section summarizes the changes to that information.

Changed Information

Minor changes were made to information about catalog management keywords.

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Chapter 1. Introduction

This publication enables users of the DFSMSdfp functional component of DFSMS to perform the following tasks:

- Develop a string of standard symptom keywords describing a DFSMSdfp program failure as precisely as possible. Record the keywords on the “Keyword Worksheet” on page 5 for permanent reference. You can make extra copies of the blank worksheet for future use.
- Use the procedure “Searching with the Keyword String” on page 2 to search an IBM software support database (or contact the IBM Support Center to execute the search using your keyword string) to determine whether the following information exits:
  – An APAR already documents the problem.
  – A resolution for the problem is available.

  You may also contact the IBM Support Center for assistance with:
  – Developing a more effective keyword string
  – Gathering additional failure-related documentation
  – Submitting adequate documentation with an APAR, if required

The keywords that this guide describes are intended for use in freeform searches. Freeform searches enable you to retrieve only the RETAIN® records that contain all the search keywords you specified. You can use the same keywords as a base from which to conduct a search of the structured database (SDB) facility. Structured searches require that you specify the exact type of problem to retain. First you enter the keyword string; then the SDB facility prompts you for the required information and builds the structured keyword string for you in the appropriate format. In other words, the structured database performs the following tasks:

- Prompts you for failure symptoms
- Generates keywords according to a strict protocol
- Initiates the search operation

If you request assistance from the IBM Support Center, and they recommend submitting an APAR, you will need the keyword strings for which you have executed searches.

You might find it useful to refer to *z/OS DFSMSdfp Diagnosis Reference* for additional general and component-specific diagnostic information. *z/OS DFSMSdfp Diagnosis Reference* covers the following topics:

- General diagnostic aids
- Asynchronous Operations Manager (AOM) diagnostic aids
- Basic Direct Access Method (BDAM) diagnostic aids
- Compression Management Services (CMP) diagnostic aids
- DADSM/CVAF diagnostic aids
- Direct Access Storage Device (DASD) common services diagnostic aids
- DESERV macro diagnostic aids
- Distributed FileManager/MVS diagnostic aids
- Interactive Storage Management Facility (ISMF) diagnostic aids
- Media manager diagnostic aids
- Object Access Method (OAM) diagnostic aids
- OPEN/CLOSE/End-of-Volume (common) diagnostic aids
- Hierarchical File System (HFS) diagnostic aids
- PDSE diagnostic aids
- Sequential access method (SAM) diagnostic aids

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- Storage Management Subsystem (SMS) diagnostic aids
- Utility service diagnostic aids
- Virtual I/O (VIO) diagnostic aids
- VSAM diagnostic aids for the following subcomponents
  - Access method services (AMS)
  - Catalog management
  - OPEN/CLOSE/End-of-Volume
  - Record-level sharing (RLS)
  - Record management (R/M)

What Are Keywords?

A keyword describes one aspect of a program failure. When doing your own software database search or contacting the IBM Support Center for assistance, identify your program failure with as many of the keywords as apply to the problem.

The full keyword string describes the following areas:
- Type-of-failure (always required)
- Module (if applicable)
- Modifier(s)
  - Function (when possible)
  - Subfunction (if applicable)
  - Other significant failure-related modifiers
- Component identification
- Release level
- Service level

Each keyword you add makes the search argument or keyword string more specific. The more precise the keyword string, the more selective the search, thereby yielding fewer matches in the software support database. If you do not find a similar problem in the database, you can broaden the scope of the search by deleting keywords, beginning at the end of the preceding list.

Searching with the Keyword String

When you have developed a keyword string describing the DFSMSdfp software failure, you are ready to search the IBM software database, using the keyword string as a search argument.

Each keyword describes one aspect of a program failure. Specifying the component identifier keyword, together with the type-of-failure keyword, as a search argument, detects all APARs for that component with that type-of-failure. The more precisely you describe the failure with additional keywords, the more selective the resulting search is, yielding fewer problem descriptions for you to review.

Recommendation: For the catalog-related failures, you should construct two keyword strings because a problem could exist in a module that services catalogs. The first string should specify the ICFCAT keyword for the catalog, and the second should specify the VSAMCAT keyword for the catalog.

Software Support Databases

Several different software support database facilities exist for researching software problems.

Info/System

Info/System is an interactive retrieval program product designed for use with the companion database feature Info/MVS. The database comprises several logical files of related or similar information.

ServiceLink

This IBMLink function lets you search up-to-date databases regarding problem resolution. Contents include open and resolved Authorized Program Analysis Reports (APARs) and Program Temporary Fix (PTF) information.

Software Support Facility (SSF)

SSF is an IBM online database containing information about all current APARs and PTFs.

IBM Support Center personnel have direct access to SSF and are responsible for using the set of keywords you provide as a search argument. These representatives can help you improve the effectiveness of your search argument. If the problem has been previously reported, they can retrieve the records describing both the problem and the correction.

TalkLink®

TalkLink enables you to review information electronically, submit questions and requests, and receive answers and information in the following ways:

- Conferences and forums

  Question-and-answer bulletin boards enable customers to ask questions and exchange experiences on a wide variety of products and services. Bulletin board system (BBS) users, IBM personnel, and affiliates worldwide share items posted on such a bulletin board.
- Customer-to-customer messaging

  Customers can send private messages to each other.
- Support

  Customers can submit or view problem reports. The conference or forum owner responds to customer entries. Users can also place orders for product-related materials.
- Software libraries

  Customers can download application programs and upload contributions.
- News and announcements

  Recent information regarding products and services are available.

Procedure

You will be most successful in searching a software support database by observing the following rules:

- Use the keywords you have developed as your freeform search argument.
- Spell keywords the same way every time, exactly as this publication specifies them.
- Specify the keywords in the order suggested in the following text.
- Include all the following keywords and those of the keywords you were able to determine in any discussion with IBM. If it becomes necessary to submit an APAR, include the keyword strings used with the APAR documentation you send to IBM.

Searching with the Keyword String

- Search the software support database, using as many of the following keywords as you have obtained and entering them in the order shown:
  1. Type-of-failure
  2. Load module, or CSECT, or both
  3. Modifiers
  4. Component identifier
  5. Release level
  6. Service level
- Scan the resulting list of known similar problems, eliminating APAR fixes that are already installed on your system.
  - If the list of matching APARs is too long to be practical, contact the IBM Support Center for assistance.
  - If you find a matching APAR problem description, contact the IBM Support Center to obtain the fix.
  - If you do not find a matching APAR problem description, broaden the search by eliminating keywords from the search argument as directed in “Techniques for Varying the Search Argument”.
  - If you still do not find a matching APAR problem description, contact the Support Center as directed in “Chapter 22. Contacting the IBM Support Center for Assistance” on page 97. They might be able to refine your search argument and find a match in the database; otherwise, they can direct you to gather additional failure-related information.
- “Preliminary Failure Source Isolation” on page 6 documents the process of building a keyword string.

Techniques for Varying the Search Argument

When using the initial search argument, if you do not find a similar APAR problem description in one of the software databases, try the following suggestions for varying the argument to see if you can obtain a match:

- If you have described the failure as a wait, loop, or performance type-of-failure, replace the type-of-failure keyword with one of the other two keywords. For example, what appears to be a wait state might actually be a loop or a performance problem.
- If more than one type-of-failure keyword applies (for example, an abend and a message both occur), try all combinations of those keywords.
- Delete one keyword at a time in the following order:
  1. Load module name
  2. Service level
  3. Release level
  4. Modifiers
  5. CSECT name

If you now identify a similar problem in the database, contact the IBM Support Center to obtain the fix.

If you still do not find a matching APAR problem description, contact the IBM Support Center as directed in “Chapter 22. Contacting the IBM Support Center for Assistance” on page 97. They might be able to refine your search argument or keyword string and find a match in the database; otherwise, they can direct you to gather additional failure-related information.

Use the following keyword worksheet to develop the keyword strings and other information to give to the IBM Support Center.

Keyword Worksheet

DATE:	TIME:	IBM PROBLEM NUMBER:

Problem Description (including symptoms not described by keywords)

IBM Licensed Program Information

PRODUCT NAME:	FMID:		
Modification:	Feature:	Order Number:	PUT Tape Level:

Base z/OS System Information

NAME:	FMID:	PUT TAPE LEVEL:

Keywords

TYPE-OF-FAILURE:	COMPONENT ID:
Module Name:	Modifiers:
Release Level:	Service Level:

Keyword Strings Used

Information Provided by IBM Support Center

Preliminary Failure Source Isolation

Use this section to isolate the probable source of a failure to an area within DFSMS or to the interfaces with ICKDSF or DFSORT™. Because you are reading this book, the assumption is that you have performed problem source identification (PSI) and some measure of problem determination (PD), and you suspect that DFSMSdfp is related to the failure. Refer to *z/OS MVS Diagnosis: Procedures*, *z/OS MVS Diagnosis: Reference*, and *z/OS MVS Diagnosis: Tools and Service Aids* for PSI and PD information.

Procedure

1. If the failure involves a DFSMSdfp component and ISMF does not seem to be involved, go to “Chapter 2. Type-of-Failure Keyword” on page 9.
2. If the failure seems related to ISMF, use Figure 1 on page 7 to identify the failing function, and continue.
   a. Use this table together with the associated entry in the ISPF log to isolate the failure source. See the sample ISPF log in the ISMF diagnostic aids section of *z/OS DFSMSdfp Diagnosis Reference*. Locate the SERVICE item in the failure-related log entry. Each SERVICE has its own description for failure-related return codes and reason codes.
   b. If the job control language (JCL) that ISMF created for a DFSMSdss™ or ICKDSF function is correct, or if DFSMShsm™ is in control, and the failure occurs in either DFSMSdss or DFSMShsm, use *z/OS DFSMSdss Diagnosis Guide* or *z/OS DFSMShsm Diagnosis Guide*, as appropriate. If the failure occurs in DFSMSrmm™, use the *z/OS DFSMSrmm Diagnosis Guide*.
   c. If the failure involves a reason code associated with one of the DASD common services, use the DASD common services-specific sections of the keyword build procedures and see the section on DASD common services diagnostic aids in *z/OS DFSMSdfp Diagnosis Reference* to gather additional failure-related information.
   d. To begin developing the keyword string, go to “Chapter 2. Type-of-Failure Keyword” on page 9.

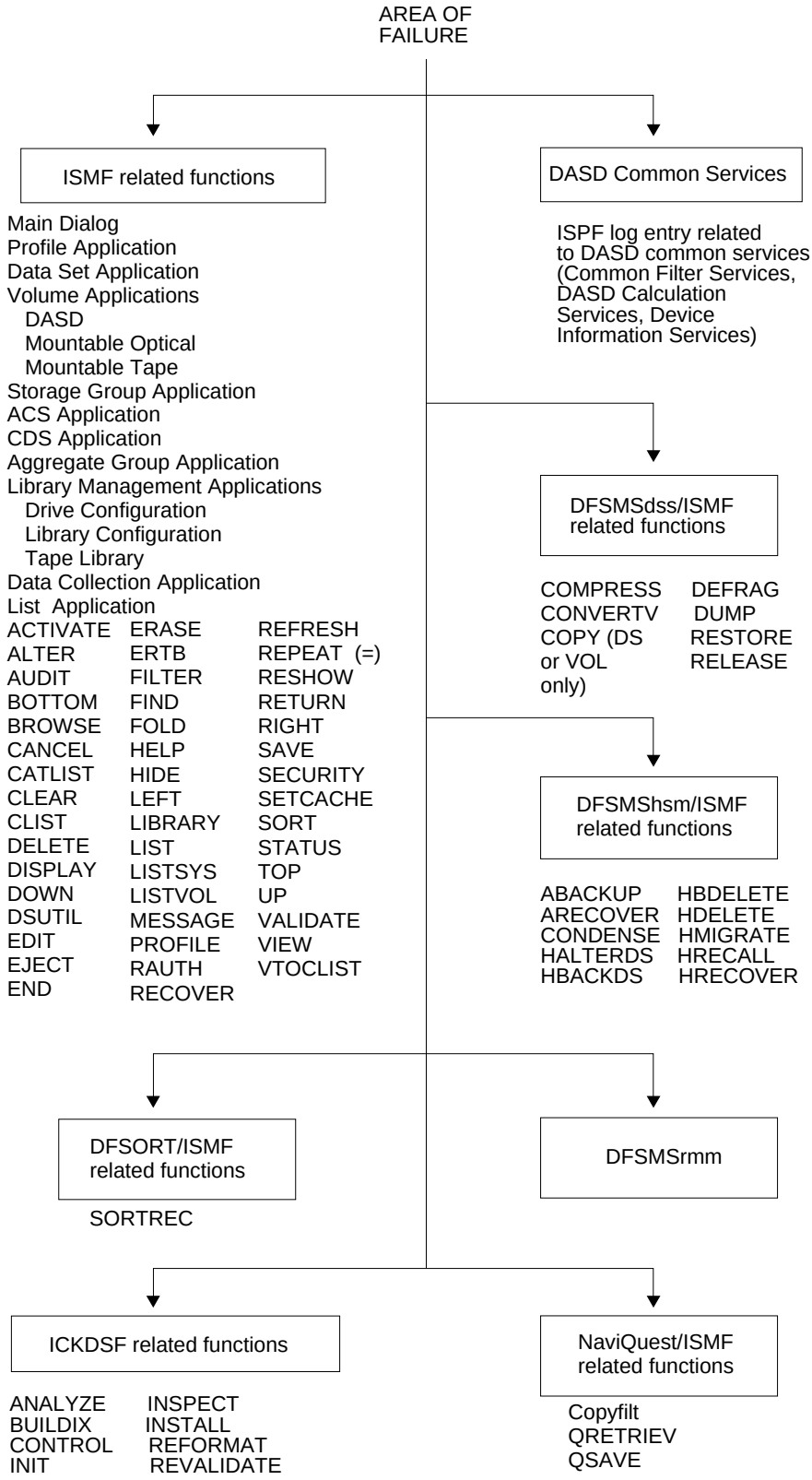

Figure 1. ISMF Failure Isolation Aid

Chapter 2. Type-of-Failure Keyword

The type-of-failure keyword is used to identify an external symptom of a program failure. This keyword is required. Use Table 1 to determine the type-of-failure keyword that best describes your problem, and then proceed as directed to construct that keyword.

Table 1. Types of Failures

Type of Failure	Description	Procedure
Abend	Abnormal termination indicated by: • The printed system output of a program • A system message's text • An ISMF abend panel • An ISPF abend panel • A TSO/E message identifying an abend • A SYS1.LOGREC record • An SVC dump in SYS1.DUMP	See "Chapter 3. Abend Keyword" on page 11.
Wait/Loop	Program unexpectedly suspended; indicated by: • No program response • Repeating messages • Repeating sequence of ISMF panels • System abends 122, 222, 322, 522, 722, A22, C22	See "Chapter 4. Wait and Loop Keywords" on page 19. For the system abends, see *z/OS MVS System Codes*for a description of these abends.
Message	Error indicated by a system message	See "Chapter 5. Message Keyword" on page 23.
Incorrect Output	• Incorrect or missing output from a program • Incorrect ISMF panel flow or information	See "Chapter 6. Incorrect Output Keyword" on page 37.
Performance	Performance less than what is expected	See "Chapter 7. Performance Keyword" on page 43.
Documentation	Incorrect or incomplete documentation	See "Chapter 8. Documentation Keyword" on page 45.

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Type-of-Failure Keyword

Chapter 3. Abend Keyword

Use this section when your program (or ISMF session) abnormally ends (abends).

Symptoms of the Failure

You can identify an abend by one or more of the following indicators:

- The printed system output of a program
- A system message's text
- An ISMF abend panel
- An ISPF abend panel
- A TSO/E message identifying an abend condition
- A SYS1.LOGREC record
- An SVC DUMP

The means by which the system indicates an abend condition provides sufficient evidence (message prefix or text, operation performed, module that detected the failure, ISMF abend panel, and so forth) to determine which DFSMSdfp component received the abend.

A damaged Virtual Storage Access Method (VSAM) data set can cause an ABEND0C4 in any of the modules in the following table. Repairing the data set resolves the problem.

IDA019RC	IDA019RE	IDA019RF	IDA019RG
IDA019RH	IDA019RI	IDA019RJ	
IDA019RN	IDA019RW	IDA019R4	

To determine whether you have a damaged data set, use the IDCAMS EXAMINE command as described in the chapter on functional command format in *z/OS DFSMS Access Method Services* and the chapter on checking a VSAM key-sequenced data set cluster for structural errors in *z/OS DFSMS: Using Data Sets*. The EXAMINE command provides details about the nature of data set damage.

For more information on diagnosing problems with damaged VSAM RLS data sets, refer to *z/OS DFSMSdfp Diagnosis Reference*.

Procedure

When an abend is encountered, the system produces one or more of the following kinds of documentation: an SVC dump, a SYSABEND, SYSMDUMP, or a SYSUDUMP. To determine the ABEND CODE, go to the procedure indicated in the following table.

Subcomponent	Procedure
ISMF/ISPF abend panel	See .
TSO/E message	See "TSO/E Messages for ISMF Abends" on page 17.
All other DFSMSdfp subcomponents	Continue with the next section, "Procedure for SVC Dump" on page 12.

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Procedure for SVC Dump

SVC dumps invoked by the SDUMP macro are usually written as a result of an entry into a *functional recovery routine* (FRR) or ESTAE routine. The *component recovery routine* specifies the addresses that are dumped and directs the dump to one of the SYS1.DUMP*xx* data sets. The SVC dump contains enough information for you to build the keyword string.

You can find the structured search keywords in the Summary Diagnostic Worksheet Figure 2 on page 14 under the section RETAIN SEARCH ARGUMENT. Use these keywords in freeform searches.

If the abend code is X'08B', then SMS has experienced a “data in virtual” (DIV) abend. Do the following:

- Obtain the registers from the time of abend, using either the `IGD300I` message or the system diagnostic work area (SDWA).
- Examine the contents of register 15. The two low-order bytes contain the DIV reason code related to the abend. Append the reason code to the keyword prefix RC. and record it on the “Keyword Worksheet” on page 5.

  See the description of the applicable DIV reason code listed under abend code 08B in *z/OS MVS System Codes*. It might help you define more closely the source of the failure. If it indicates that the problem is external to DFSMSdfp, continue the diagnosis process within the component involved.

If the abend code is X'0F4', then an error occurred during program management binder, DCME, HFS, PDSE, or VSAM RLS processing. Do the following:

- Review SYS1.LOGREC for X'0F4' software records, PDSE symptom records, and any other records produced at the time of the error. Program management binder, DCME, HFS, PDSE, and VSAM RLS symptom records are primarily used to identify incidents identified with program management binder, DCME, HFS, PDSE, and VSAM RLS X'0F4' abends. When program management binder, DCME, HFS, PDSE, or VSAM RLS symptom records occur without an X'0F4', use the symptom strings to search for matching problems in the IBM software support database, and if no errors exist, contact the IBM Support Center.
- Prior to the ABEND error, a return code is placed in general register 15, and a unique reason code is placed in general register 0 describing the exceptional condition. Append the reason code from general register 0 to the keyword prefix RSN and record it as a modifier keyword on the “Keyword Worksheet” on page 5. Remove the leading zeroes from the return code from general register 15 and append it to the keyword prefix RC. Record it as a modifier keyword on the “Keyword Worksheet” on page 5. Using the information from Figure 2 on page 14 as an example, the modifier keywords would be as follows:

  ```
  abend0f4   rsn21042716  rc24
  ```

  PDSE reason codes are used primarily for searching the IBM software support database; therefore, reason code descriptions are not documented in *z/OS DFSMSdfp Diagnosis Reference*.

Procedure for SVC Dump

To determine keywords for SVC dumps, do the following:

1. Use IPCS to print the summary dump (SUMDUMP). See *z/OS MVS IPCS User's Guide*.
2. The title page of the Summary Diagnostic Worksheet contains the dump header and title page, which provide failure-related symptoms extracted from the dump. (See the example in Figure 2 on page 14.) One or more of the following symptoms should be present:
   - ABEND*nnn*
   - Module or CSECT name or both
   - Component Identifier
   - Release Level
   - Service Level
   - FMID

   Refer to *z/OS MVS Diagnosis: Procedures*, *z/OS MVS Diagnosis: Reference*, and *z/OS MVS Diagnosis: Tools and Service Aids* for a detailed explanation of each symptom.
3. If you can identify the ABEND CODE by using the dump header and title page, see "Building the Abend Keyword" on page 15.
4. If the dump does not have a header title or does not otherwise enable you to identify the ABEND CODE, use the SUMDUMP printed from the SYS1.DUMP*xx* data set and continue with "Procedure for SYSABEND, SYSMDUMP, or SYSUDUMP" on page 15.

Procedure for SVC Dump

```
TITLE
LIST 00000000 HEADER POSITION(:hex.0058:ehex.) LENGTH(97) CHARACTER
HEADER ADDRESS(00000058)
00000058 |                          COMPID=DF115,CSECT=IGWBVLP1+0F0C,DATE=12 |
00000080 | /20/91,MAINTID=NONE    ,ABND=0F4,RC=00000024,RSN=21042716         |
                      * * * *  S Y M P T O M  * * * *
  Primary Symptom String:
    RIDS/IGWBBMF1#L RIDS/IGWBVLP1 PIDS/5695DF115 AB/S00F4 RIDS/IGWBSGLR#R VALU/HD1641854 REGS/0E010 REGS/0CEE4
    PRCS/00000024
    Symptom            Symptom data       Explanation
    ---------------    -------------      -----------
    RIDS/IGWBBMF1#L    IGWBBMF1#L         Routine identifier
    PIDS/5695DF115     5695DF115          Component identifier
    AB/S00F4           00F4               ABEND code - system
    RIDS/IGWBSGLR#R    IGWBSGLR#R         Routine identifier
    VALU/HD1641854     D1641854           Error related hexadecimal value
    REGS/0E010         0E010              Program register
    PRCS/00000024      00000024           Return code
The dump does not contain a secondary symptom string.
         ****** DUMP ANALYSIS AND ELIMINATION (DAE) ******
THIS DUMP WAS NOT SUPPRESSED BECAUSE
DAE WAS NOT CHECKING FOR PREVIOUS OCCURRENCES.
CRITERIA FOR USE AS A UNIQUE DUMP IDENTIFIER BY DAE:
     MINIMUM NUMBER OF SYMPTOMS:  07  FOUND: 09
     MINIMUM TOTAL STRING LENGTH: 025 FOUND: 130
     SYMPTOMS REQUIRED TO BE PRESENT: MOD/ CSECT/
     SYMPTOMS THAT ARE TO BE USED IF AVAILABLE, BUT ARE NOT REQUIRED:
       PIDS/ AB/S AB/U REXN/ FI/ REGS/ HRC1/ SUB1/
MVS SYMPTOM STRING:
MOD/IGWBBMF1 CSECT/IGWBVLP1 PIDS/5695DF115 AB/S00F4 REXN/IGWBSGLR
FI/9C7918F60A0D4140D1641854 REGS/0E010 REGS/0CEE4 HRC1/00000024
RETAIN SEARCH ARGUMENT:
RIDS/IGWBBMF1#L RIDS/IGWBVLP1 PIDS/5695DF115 AB/S00F4 RIDS/IGWBSGLR#R
VALU/HD1641854 REGS/0E010 REGS/0CEE4 PRCS/00000024
SYMPTOMS PRESENT FOR USE AS A UNIQUE DUMP IDENTIFIER BY DAE: RETAIN
MVS KEY   KEY     SYMPTOM DATA               EXPLANATION
-------  ------   ------------               -----------
MOD/     RIDS/    IGWBBMF1                   LOAD MODULE NAME
CSECT/   RIDS/    IGWBVLP1                   ASSEMBLY MODULE CSECT NAME
PIDS/    PIDS/    5695DF115                  PRODUCT/COMPONENT IDENTIFIER
AB/S     AB/S     S00F4                      ABEND CODE-SYSTEM
REXN/    RIDS/    IGWBSGLR                   RECOVERY ROUTINE CSECT NAME
FI/      VALU/H   9C7918F60A0D4140D1641854   FAILING INSTRUCTION AREA
REGS/    REGS/    0E010                      REG/PSW DIFFERENCE
REGS/    REGS/    0CEE4                      REG/PSW DIFFERENCE
HRC1/    PRCS/    00000024                   REASON CODE
ADDITIONAL SYMPTOM DATA NOT USED BY DAE TO IDENTIFY THIS DUMP: RETAIN
MVS KEY   KEY     SYMPTOM DATA               EXPLANATION
-------  ------   ------------               -----------
CID1/    VALU/C   DF115                      COMPONENT IDENTIFIER
AMD1/    VALU/C   12#20#91                   MODULE ASSEMBLY DATE
VRS1/    VALU/C   NONE                       VERSION-PRODUCT/PTF IDENTIFIER
RRL1/    FLDS/    IGWFRCSD                   RECOVERY ROUTINE LABEL
CDB1/    VALU/C   5695                       BASE COMPONENT IDENTIFIER
FRR1/    VALU/H   C9C7E6C6C5C6D7407F6810287F681250
                                            FRR PARAMETER AREA
ASID1/   VALU/H   004D                       TASK RELATED ASID
ORCC1/   PRCS/    0F4000                     ORIGINAL COMPLETION CODE
ORRC1/   PRCS/    00000024                   ORIGINAL REASON CODE
@201/    VALU/C   W                          DEVELOPER ASSIGNED SYMPTOM KEY
@201/    VALU/C   H                          DEVELOPER ASSIGNED SYMPTOM KEY
@202/    VALU/C   ##                         DEVELOPER ASSIGNED SYMPTOM KEY
@202/    VALU/C   #COMPID#DF115#CSECT#IGWBVLP1#0F0C#DATE#12#20#
                                            DEVELOPER ASSIGNED SYMPTOM KEY
```

Figure 2. Sample Summary Diagnostic Worksheet

Procedure for SYSABEND, SYSMDUMP, or SYSUDUMP

Depending on the JCL used, the system directs a dump to the SYSUDUMP, SYSABEND, or SYSMDUMP data set. If the system did not produce a dump, you might need to recreate the failure and obtain one. For information about obtaining a dump, see *z/OS MVS Diagnosis: Tools and Service Aids*.

Note: SYSUDUMP data sets usually do not contain enough information to be useful in diagnosing a failure.

1. Obtain a system storage dump that contains the user's program.
2. Determine the system abend code by using either:
   - The job-related information about the abend in the job log.

     This information includes the abend code, PSW contents, and general-purpose register contents. The abend code is 3 characters long. To obtain the job log, you must specify the JCL parameter `MSGLEVEL=(1,1)` on your JCL JOB card.
   - The system storage dump.
     – Locate the formatted section at the beginning of the dump. Determine the abending job by locating the job whose abend code field (TCBCMP at TCB + X'11') contains a nonzero value.
     – The field is only 3 characters long. Ignore the first (left-most) byte. If the abend code appears in the first 12 bits following the first byte, it is a system abend code. If it appears in the next 12 bits, it is a user abend code, and the value must be converted to decimal.

       For more information on dump documentation and analysis, see *z/OS MVS Diagnosis: Tools and Service Aids*.
3. When you determine the ABEND CODE, continue with "Building the Abend Keyword".

Building the Abend Keyword

To build the abend keyword, do the following:

1. Use the ABEND CODE that you have extracted from the system-produced documentation.

   System abends are expressed in hexadecimal; user abends are expressed in decimal.

   For a system abend, append the 3-character code to the keyword prefix ABEND.

   Example: If the abend code is 0C4, specify the abend type-of-failure keyword as follows:

   ```
   ABEND0C4
   ```

   For a user abend, append the 4-digit code to the keyword prefix ABENDU.

   Example: If the abend code is 0222, specify the abend type-of-failure keyword as follows:

   ```
   ABENDU0222
   ```
2. If a message containing a return code accompanies the abend, include the return code in your keyword string as a modifier keyword. Append the code (specified exactly as it appears in the message) to the keyword prefix RC.

   Example: If the return code is 04, specify the keyword string as follows:

   ```
   ABEND0C4 RC04
   ```

Procedure for SVC Dump

Tip: If the *z/OS MVS System Codes* description of the abend code indicates a return code and the reason code is associated with the abend, including both the return code and the reason code in your keyword string could restrict the scope of a software database search that results in no matches.

3. If the *z/OS MVS System Codes* description of the abend code indicates a reason code is associated with the abend, include the reason code in your keyword string as a modifier keyword. Append the code (specified exactly as it appears in the register) to the keyword prefix RSN.

   Example: If the abend code is X'0F4', then the reason code is found in general register 0. If the reason code is 0409F023, specify the keyword string as follows:

   ```
   ABEND0F4 RSN0409F023
   ```

4. See “Chapter 9. Module Keyword” on page 47 (directly to the subcomponent-specific section, if one exists).

ISMF/ISPF—Abend Panels

Use this section when your program ends abnormally, and ISMF or ISPF seems to be the cause of the failure.

You can recognize an abend failure from one of the following symptoms:

- An ISMF or ISPF abend panel appears on the screen, providing the ABEND CODE. Figure 3, which follows, and Figure 4 on page 17 show sample abend panels. Record the ABEND CODE and see “Building the Abend Keyword” on page 15.
- A TSO/E message appears, indicating an abend condition. See “TSO/E Messages for ISMF Abends” on page 17.

```
                          ISMF ABEND PANEL
COMMAND ===> _



********************************************************************************
********************************************************************************
**                                                                            **
**                                                                            **
**                  AN ABEND OCCURRED WHILE EXECUTING ISMF                    **
**                                                                            **
**                        SYSTEM ABEND CODE:  0C4                             **
**                                                                            **
**                          ISMF CANNOT CONTINUE                              **
**                                                                            **
**            PRESS THE ENTER KEY OR USE END TO TERMINATE ISMF                **
**            USE HELP TO DISPLAY A LIST OF COMMON ABEND CODES                **
**                                                                            **
********************************************************************************
********************************************************************************
```

Figure 3. ISMF—Abend Panel

```
----------------------ERROR RECOVERY------------------------------

COMMAND ===>


    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    * *                                                           * *
    * *      ISPF PROCESSOR ENDED ABNORMALLY                      * *
    * *                                                           * *
    * *                                                           * *
    * *                                                           * *
    * *                                                           * *
    * *           Task ABEND code 0C1                             * *
    * *                                                           * *
    * *                                                           * *
    * *                                                           * *
    * *                                                           * *
    * *   Press ENTER to display primary option menu.             * *
    * *   Enter HELP command for list of common ABEND CODES.      * *
    * *                                                           * *
    * *                                                           * *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Figure 4. ISMF—ISPF Abend Panel

TSO/E Messages for ISMF Abends

When ISMF terminates abnormally and ISPF is in TEST/TRACE mode, the system issues a TSO/E message that indicates the failure.

See also: This is not an ISMF message. See Figure 5 for an example of a TSO/E message.

Some problems cannot be recreated, so you might not always be able to get a dump or develop a full keyword string that describes the problem. You can, however, build the abend keyword by using the symptom dump displayed on your terminal screen and following the instructions in “Building the Abend Keyword” on page 15.

```
* SPF  SUBTASK  ABEND *
ISPF      ENDED DUE TO ERROR+
READY
```

Figure 5. ISMF—TSO/E Error Message

Procedure

1. The plus sign (+) at the end of the message indicates that additional information is available. If you enter a question mark (?), TSO/E displays a message describing the error in greater detail. The question mark must be the next command from the terminal, or the supplemental information is lost.
2. To further diagnose the error, you need a dump of the abend. Press ENTER to generate the dump. If you have WTP message turned on in your TSO/E profile, the system displays a symptom dump on the terminal screen. (For information about the TSO/E profile, see *z/OS TSO/E Command Reference*.) Figure 6 shows a sample symptom dump.

```
IEA995I  SYMPTOM DUMP OUTPUT
 ABEND CODE  USER = 0222  TIME = 15.29.00 SEQ=22374 CPU = 000 ASID =007B
 PSW AT TIME OF ERROR  078D1000   00B5A992      ILC 2  INTC 0D
   NO ACTIVE MODULE FOUND
   DATA AT PSW  00B5A98C - 00181610  0A0D9180  A0644710
   GPR  0-3    80000000   800000DE   0000E060   000184A8
   GPR  4-7    000184AC   00018898   00000005   00000005
   GPR  8-11   00010B28   0000E810   0000DC30   00B5A788
   GPR 12-15   91B59788   000193D0   000185C7   00000000
 END OF SYMPTOM DUMP
**LOGICAL SCREEN REQUEST FAILED - ABEND 0000DE**
**CONTACT YOUR SYSTEMS PROGRAMMER OR DIALOG DEVELOPER**
***SPF MAIN TASK ABEND***
ISPF    ENDED DUE TO ERROR+
READY
```

Figure 6. ISMF—Displayed System Symptom Dump

   If a SYSUDUMP, SYSMDUMP, or SYSABEND data set was allocated before the error, the system directs a full abend dump to the dump data set. You will use the dump later to determine the module keyword.
3. See “Building the Abend Keyword” on page 15.

   Tip: If you did not have a dump data set allocated before the abend occurred, you can do the following after you build the abend keyword:

   a. Allocate a dump data set by using the TSO ALLOC command.
   b. Invoke ISPF with the TEST parameter by issuing the ISPF TEST command.
   c. Specify `RECOVER FROM ABENDS ===> N` in your ISMF profile.
   d. Try to recreate the problem by going through your ISMF session again.

Chapter 4. Wait and Loop Keywords

Use this section when a DFSMSdfp function appears to be waiting or looping.

Symptoms of the Failure

You can identify a wait or loop condition by means of one of the following conditions:

- Suspended activity while waiting for some condition to be satisfied
- Endless instruction loop
- Repetition of messages
- Repetition of a sequence of ISMF panels
- No system response; for example, an ISMF panel remains on the terminal screen indefinitely after the operator has taken action that should cause it to change

Because wait and loop failures are often hard to differentiate, this section documents both keywords.

Procedure

1. The failure indications should enable you to establish whether ISMF is involved or not. If you suspect a failure in ISMF, see “ISMF—Wait and Loop Keywords” on page 20.
2. For all other DFSMSdfp components, obtain the following:
   - A console dump initiated by the MVS DUMP command before the operator cancels the job.
   - A copy of the SYS1.LOGREC data set. Use IEBGENER to copy the SYS1.LOGREC data set to a standard label tape. This data set contains the event history leading up to the wait problem.
3. Using the dump, scan the RBs to see if a WAIT SVC was issued. The INTCODE field of the RB contains 0001 for jobs that issued a WAIT SVC, if the high-order byte of the LINK field of the RB contains a nonzero value, indicating the number of events being waited or suspended on.
4. If these fields do not indicate a WAIT condition, assume that the failure is a LOOP.
5. In either case, record the current PSW address in the waiting or looping RB’s OPSW field as the failing address. You will use it to determine the failing module. Specify either the WAIT keyword or the LOOP keyword.

   You might find the following information useful in isolating the source of a LOOP failure to a specific module:
   - If the FLCDE field for the RB is nonzero, it points to a cde entry of the entry point of a load module. That load module might contain the failing CSECT.
   - A system branch trace (invoked by the operator from the console). This makes an entry in the system trace table for every successful branch instruction. (See *z/OS MVS Diagnosis: Tools and Service Aids* for the format of the system trace table.)
   - An AMBLIST listing or SPZAP dump of a CSECT or CSECTs that you suspect (see *z/OS MVS Diagnosis: Tools and Service Aids*).

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6. A wait on the ENQ and DEQ major resource names IGDCDS, IGDCDSXS, or SYSZIGDI, indicates that the Storage Management Subsystem (SMS) is involved in the failure. Record the indicated major resource name and the minor resource name as modifier keywords on the “Keyword Worksheet” on page 5.
7. A wait on the ENQ/DEQ major resource names SYSZIGW0 and SYSZIGW1 indicates that the program manager binder, HFS, or PDSE is involved in the failure. Record the indicated major resource name and the minor resource name as modifier keywords on the “Keyword Worksheet” on page 5.
8. For VSAM Record Management/Block Processor, see “VSAM Record Management/Block Processor—Wait and Loop Keywords” on page 22.
9. For all other DFSMSdfp components, see “Chapter 9. Module Keyword” on page 47.

ISMF—Wait and Loop Keywords

Use this section when a wait or loop condition seems to be occurring and you suspect ISMF of causing a failure.

If a request from a selection panel seems to be taking an abnormally long time to process, the delay could be related to legitimate selection criteria you have specified. Because the entries in the list generated must meet all of the criteria you establish on the selection panels, each value you specify must be verified before the list can be generated. To speed up processing you can try the following:

- Limit the number of entries in the list by making your selection criteria more specific.
- For data set selection, the time it takes to build a list is affected by the number of times ISMF must access the catalog or VTOC. If you are generating the list from the catalog, observe the following rules:
  – Do not acquire data for data sets migrated by DFSMShsm.
  – Do not acquire data from the volume.

Procedure

1. If you have made the distinction between WAIT and LOOP keywords, identifying the failure as either one or the other, specify the type-of-failure keyword as either WAIT or LOOP and see “ISMF—Modifier Keywords” on page 77. Otherwise, continue with 2.
2. If you know the failure is either a wait or a loop, but cannot determine which, you need a dump to diagnose the problem. If the system has not produced a dump, see the section on determining how ISMF handles dumps in *z/OS DFSMSdfp Diagnosis Reference*. If you have a dump, continue here.
3. Use IEBGENER to copy the SYS1.LOGREC data set to a standard label tape. This data set contains the event history leading up to the wait problem.
4. Find the Program Status Word (PSW) in the dump. See Figure 7 on page 21.

```
JOB USER20         STEP IEFPROC       TIME 143854   DATE 92091    ID = 000    CPUID = FF0212543084   PAGE 00000001
COMPLETION CODE      USER = 0122
PSW AT ENTRY TO ABEND  078D1000 80023534        ILC 2   INTC 000D
PSW ADDRESS 00023534 AT TIME OF ERROR DOES NOT POINT TO AN ACTIVE MODULE

 ASCB   00F77D80
        +0000  ASCB    ASCB      FWDP      00F62780  BWDP      00F63B80    CMSF      00000000  SVRB      007FD540
        +0014  SYNC    00007BD5  IOSP      00000000  TNEW      007BB318    CPUS      00000001  ASID      000B
        +0026  SEQN    0007      LL5       00        RV01      00          HLHI      01        DP        3D
        +002C  RV00    00000000  LDA       7FF144E8  RSMF      00          RV81      000000    CSCB      00F77CC8
        +003C  TSB     00AAD188  EJST      00000036  40F84A00                EWST      9A562011  BE215E40
        +0050  JSTL    000141DD  ECB       807FDAD8  UBET      9A561FE9    TLCH      00000000  DUMP      007FD080
        +0064  AFFN    FFFF      RCTF      01        FLG1      00          TMCH      00000000  ASXB      007FDC20
        +0070  SWCT    6667      DSP1      00        FLG2      00          RSV       0000      SRBS      0000
        +0078  VSC     0000      NVSC      018E      RCTP      007FDE40    LOCK      00000000  LSQH      00000000
        +0088  QECB    00000000  MECB      40000000  OUCB      0194EF08    OUXB      01138928  FMCT      008E
        +009A  LEVL    02        RV02      00        XMPQ      00000000    IQEA      00000000  RTMC      00000000
        +00A8  MCC     00000000  JBNI      00000000  JBNS      00F77CD0    SRQ1      00        SRQ2      00
        +00B6  SRQ3    00        SRQ4      00        VGTT      00000000    PCTT      00000000  SSRB      0000
        +00C2  SMCT    00        SRBM      07        SWTL      0000023C    SRBT      00000006  40D3CC00
        +00D0  LSMQ    00000000  LSPL      00000000  TCBS      00000001    TCBL      00000000  WPRB      007FEB00
        +00E4  NDP     3D        TNDP      FF        NTSG      FF          IODP      3D        LOCI      00000000
        +00EC  CMLH    00000000  CMLC      00000000  SSO1      000000      SSO4      00        ASTE      00F5E0B0
        +00FC  LTOV    7FFFD000  ATOV      7FFFE750  ETC       0000        ETCN      0000      LXR       0000
        +010A  AXR     0000      STKH      007FEB10  GQEL      00000000    LQEL      00202990  GSYN      00000000
        +011C  XTCB    007FF800  CS1       00        RV58      000000      GXL       00000000
        +0128  EATT    00000000  604C5000            INTS      9A560F23    A8898E00            LL1       00
        +0139  LL2     00        LL3       00        LL4       00          RCMS      00000000  IOSC      00003933
        +0144  PKML    0080      XCNT      01F4      NSQA      00000000    ASM       0193AEE0  RV30      00000000
        +0154  TCME    00000000  RV70      00000000  00000000  00000000    00000000            CREQ      0000006B
        +016C  RSME    0193AEC0  RV86      00000000  ARC       00000000    RSMA      0193AE08  DCTI      0006F626
        +0180  TAXT    00000000  00000000            SAXT      00000000    00000000
        +0190  TCPT    00000036  42CEFC00            SCPT      00000006    40EFBE00
```

Figure 7. ISMF—Locating the PSW in an ISMF Dump

5. Determine whether the WAIT bit (bit 14) of the PSW is on or off. For example, in Figure 7, the PSW is `078D1000 80023534`. The hexadecimal digit `D` is bits 12 through 15. Expressed in bits, this value is `1101`. Bit 14 (the wait state bit) is off. If Bit 14 is off, specify the type-of-failure keyword as LOOP.
6. If Bit 14 is on, specify the type-of-failure keyword as WAIT.
7. See “ISMF—Modifier Keywords” on page 77.

Object Access Method—Wait and Loop Keywords

Use this section when you feel that a wait or a loop seems to be occurring and you suspect OAM is causing the failure.

OAM Storage Management Component—Wait and Loop Keywords

Use the information presented below to identify a potential system wait or loop. Then contact the IBM Support Center for assistance with analyzing the dump.

OSMC processes storage groups individually and sends a message after each storage group has completed processing:

- The message `CBR9048I` is displayed upon successful processing of a storage group.
- The message `CBR9049I` is displayed upon unsuccessful processing of a storage group.

Object Access Method—Wait and Loop Keywords

If the system does not issue a message, the system could be waiting or looping.

To diagnose the problem, you must generate a dump of the OAM address space by issuing the DUMP command. The following entries should be produced in the dump:

```
SDATA=(TRT,LPA,CSA,PSA,GRSQ,SUM,SQA,ALLNUC,LSQA,RGN,SWA)
```

Refer to *z/OS MVS System Commands* for information on how to generate a dump.

After producing a dump, use IEBGENER to copy the SYS1.LOGREC data set to a standard label tape. This data set contains the event history leading up to the wait problem.

Recommendation: If you have the DFSORT product installed, you should be using ICEGENER as an alternative to IEBGENER when making an unedited copy of a data set or member. It might already be installed in your system under the name IEBGENER. It generally provides better performance.

VSAM Record Management/Block Processor—Wait and Loop Keywords

Use this section to determine whether additional analysis is required when either a wait or loop condition occurs and you suspect the VSAM Record Management/Block Processor subcomponents of causing the failure. This section does not apply to VSAM RLS.

Procedure

1. Some wait and loop failures involve reading or writing data to a damaged VSAM data set. To determine whether you have a damaged data set, use the IDCAMS EXAMINE command as described in the chapter on functional command format in *z/OS DFSMS Access Method Services* and the chapter on checking a VSAM key-sequenced data set cluster for structural errors in *z/OS DFSMS: Using Data Sets*. The EXAMINE command provides details about the nature of data set damage.

   Waits or loops can occur in several VSAM modules because of a damaged VSAM data set. Table 2 lists the most commonly involved modules.

Table 2. Common VSAM Modules for Wait and Loop

IDA019RA	IDA019RI	IDA019R2
IDA019RB	IDA019RJ	IDAM19R3 (IDA019R3)
IDA019RC	IDA019RN	IDA019SE
IDA019RE	IDA019RW	IDA019SY
IDA019RH	IDA019RY	

   A loop might also be indicated by the reissuing of either SVC121 (X'79') or Start Subchannel (SSCH). If an apparent wait occurs and a console dump is taken, the following symptom might indicate the involvement of a damaged data set:

   - SVC01 WAITs issued by module IDA019RZ

2. Use IEBGENER to copy the SYS1.LOGREC data set to a standard label tape. This data set contains the event history leading up to the wait problem.
3. See “Chapter 9. Module Keyword” on page 47.

Chapter 5. Message Keyword

Use this section for all DFSMSdfp message-related problems.

Symptoms of the Failure

You can identify a message type-of-failure when one of the following conditions occurs:

- Message reports program or operation failure.
- Message is missing data, or contains invalid data.
- Message reports a data failure (catalog, user data).
- No message appears when one should have been issued.

Procedure

Before using this section, examine *z/OS MVS System Codes* and *z/OS MVS System Messages, Vol 1 (ABA-AOM)*, through *z/OS MVS System Messages, Vol 10 (IXC-IZP)*. These might help you generate additional keywords by identifying failure-related functions and providing message-to-module cross-reference tables.

Definition of Message Keyword Related Terms

The component-specific message keyword sections use the terms defined in Table 3.

Table 3. Definition of Message Keyword Related Terms

Term	Definition
Message identifier	A three-letter prefix to identify the component that produced the message and a message serial number to identify the individual message (for example, IDC3009I).
Message keyword prefix	The characters MSG, to which the message identifier is appended. This comprises the message type-of-failure keyword.
Return or reason code	A numeric code contained in the message text. Either the message text or *z/OS MVS System Messages, Vol 1 (ABA-AOM)*, through *z/OS MVS System Messages, Vol 10 (IXC-IZP)*, can identify the type of code.
Return or reason code keyword prefix	The characters RC, to which each return or reason code (exactly as it appears in the message) is appended. (Each code in the text requires its own keyword prefix.) This comprises a modifier keyword to specify the failure-related symptom.

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Message Keyword

Go to one of the procedures indicated in the following table.

Subcomponent	Procedure
DADSM/CVAF	See .
ISMF	See “ISMF—Message Keyword” on page 26.
OAM	See “Object Access Method—Message Keyword” on page 31.
SMS	See “Storage Management Subsystem—Message Keyword” on page 31.
VSAM Record Management	See .
All other DFSMSdfp components	Continue below.

1. Append the message identifier to the keyword prefix MSG. Include in the keyword string any return codes and reason codes from the message text. Append the codes, exactly as they appear in the message to the keyword prefix RC.

   Example: If the message identifier is IDC3009I, the return code is 04, and the reason code is 032, specify the keyword string as follows:

   ```
   MSGIDC3009I RC04 RC032
   ```

   Rule: For PDSE-related failures (IGW messages), use RSN as the prefix for reason codes and RC as the prefix for return codes.
2. Message text might contain additional information that you can use as modifier keywords (function, subfunction, device-related information, and so forth); record it on the “Keyword Worksheet” on page 5.
3. For input/output or hardware-related errors, review the SYS1.LOGREC for keyword information.
4. See “Chapter 9. Module Keyword” on page 47.

DADSM/CVAF—Message Keyword

Use this section when a message indicates a failure in DADSM/CVAF.

Procedure

Before using this section, examine *z/OS MVS System Codes* and *z/OS MVS System Messages, Vol 1 (ABA-AOM)*, through *z/OS MVS System Messages, Vol 10 (IXC-IZP)*. These might help you generate additional keywords by identifying failure-related functions and providing message-to-module cross-reference tables.

See “Definition of Message Keyword Related Terms” on page 23 for definitions of the following terms used in this section:

Message identifier
Message keyword prefix
Return or reason code
Return or reason code keyword prefix

Messages Issued by DADSM/CVAF

IEC614I—DADSM issues this message.

1. Append the message identifier and function return code to their appropriate prefixes. Append the 4-byte diagnostic information field to the prefix RSN and record on the “Keyword Worksheet” on page 5 all failure-related function modifier keywords.

   Example: Suppose the message is the following one:

   ```
   IEC614I RENAME FAILED - RC4, DIAGNOSTIC INFORMATION IS
   (040D002D),STEP01,VOL0002,DATASET1
   ```

   Specify the keyword string as follows:

   ```
   MSGIEC614I RENAME RC4 RSN040D002D
   ```

2. See “Chapter 10. DADSM/CVAF—Module Keyword” on page 49.

IEC603I—DADSM issues this message.

1. Append the message identifier to the keyword prefix MSG and record it on the “Keyword Worksheet” on page 5 as the type-of-failure keyword. Append the cde code to the keyword prefix RC and record it on the “Keyword Worksheet” on page 5 as a modifier keyword.

   Example: If the cde field contains 04, specify the keyword string as follows:

   ```
   MSGIEC603I RC04
   ```

2. If a dump entitled “DADSM (OBTAIN, SCRATCH, ALLOCATE, OR EXTEND) ERROR” is taken, then DADSM caused the dump because of an unexpected CVAF error. Continue below, using the DADSM dumps section in *z/OS DFSMSdfp Diagnosis Reference* for CVAF dump analysis assistance.
3. Record either the DADSM function name from the dump title (for example, OBTAIN) or the 2-character code for the CVAF function last issued (and the 2-character subfunction code, if applicable), as indicated by the 1-byte CVFCTN field (offset X'06' in the CVPL), as a modifier keyword. The CVPL is in the DADSM work area. See Table 12 on page 75 for a list of valid CVFCTN field values.

   Example: If the CVFCTN field contains X'07', record the modifier keywords as:

   ```
   IX DEL
   ```

4. See “Chapter 10. DADSM/CVAF—Module Keyword” on page 49.

IEC606I—CVAF issues this message. It is related to CVAF ABEND18B.

1. Append the message identifier to the keyword prefix MSG and record it on the “Keyword Worksheet” on page 5 as the type-of-failure keyword. Append the cde code to the keyword prefix RC and record it on the “Keyword Worksheet” on page 5 as a modifier keyword.

   Example: If the cde field contains 153, specify the keyword string as follows:

   ```
   MSGIEC606I RC153
   ```

   Continue below, using the DADSM dumps section of *z/OS DFSMSdfp Diagnosis Reference*for CVAF dump analysis assistance.
2. If the message type-of-failure keyword search (without the abend keyword) is inconclusive, perform software database searches by specifying keywords as follows:
   - Both ABEND18B and MSGIEC606I together as type-of-failure keywords
   - ABEND18B alone as the type-of-failure keyword
3. Record the CVAF module name identified in the system dump title on the “Keyword Worksheet” on page 5.

4. See “Chapter 10. DADSM/CVAF—Module Keyword” on page 49.

IEC608I or IEC609I—If DADSM issued either message and disabled the VTOC index, CVAF issues message IEC606I, error code 153, and causes a system dump.

1. IEC608I—Use the explanation of the message’s cde field and the message-to-module cross-reference table in *z/OS MVS System Messages, Vol 7 (IEB-IEE)*, to determine the related module and function. If available, append these symptoms to their respective prefixes and record them on the “Keyword Worksheet” on page 5. Continue below, using the DADSM dumps section of *z/OS DFSMSdfp Diagnosis Reference* for CVAF dump analysis assistance.
2. IEC609I—Append the single-digit function code from the message text to the prefix IGGVRF0 to determine the related module name. Append the message identifier and the message’s cde field to their respective identifiers and record these keywords and the function keyword (identified by the value in the message’s `fctn` field) on the “Keyword Worksheet” on page 5. Continue below, using the DADSM dumps section of *z/OS DFSMSdfp Diagnosis Reference* for CVAF dump analysis assistance.

   Example: Append the symptoms to their respective keyword prefixes as shown:

   ```
   MSGIEC608I SCRATCH RC12
   MSGIEC609I IGGVRF01 ALLOCATE RC04
   ```

3. See “Chapter 10. DADSM/CVAF—Module Keyword” on page 49.

ISMF—Message Keyword

Use this section when a message indicates an ISMF problem.

Procedure

Before using this section, examine *z/OS MVS System Codes* and *z/OS MVS System Messages, Vol 1 (ABA-AOM)*, through *z/OS MVS System Messages, Vol 10 (IXC-IZP)*. These might help you generate additional keywords by identifying failure-related functions and providing message-to-module cross-reference tables.

See “Definition of Message Keyword Related Terms” on page 23 for definitions of the following terms used in this section:

- Message identifier
- Message keyword prefix
- Return or reason code
- Return or reason code keyword prefix

Identifying the Error Message Source

Two types of error messages can occur when you run ISMF:

- Error messages issued by other subcomponents that interrupt the screen

  See Figure 8 for an example of a TSO/E message that can interrupt the screen. See “Messages Issued by Other Subcomponents” on page 29 to diagnose the error.

```
CSV003I REQUESTED MODULE DGTFTCMD NOT FOUND
***
```

Figure 8. ISMF—TSO/E Messages That Interrupt the Screen

- ISMF or ISPF short error messages

  Figure 9 is an example of an end-user ISMF panel with the short message:

  `COMPRESS FAILED`

  ISPF short error messages have the same format. To determine whether ISMF or ISPF issued the error message, see “Identifying an ISMF Error Message” on page 28.

```
                                VOLUME LIST                    COMPRESS FAILED
COMMAND ===> COMPRESS                                         SCROLL ===> HALF
                                                            Entries 1-14 of 37
ENTER LINE OPERATORS BELOW:                                 Data Columns 3-8 of 39

    LINE       VOLUME  FREE     %     ALLOC    FRAG   LARGEST  FREE
    OPERATOR   SERIAL  SPACE    FREE  SPACE    INDEX  EXTENT   EXTENTS
   ---(1)----  -(2)--  --(3)--  (4)-  --(5)--  -(6)-  --(7)--  --(8)--
   ?COMPRESS   SCR001  1342355    72   523197    122   793299       25
               SCR002  1113616    60   751936     25  1067335       15
               SCR003  2835621    99    39669      1  2830511        4
               SCR004  2859732    99    15558      1  2856345        3
               SYS300   353342    19  1512210    270   164468      109
               SYS301   363133    19  1502419    113   311792       79
               SYS302   396767    21  1468785    224   165312       72
               SYS303   345098    18  1520454    234   254689      264
               SYS304   398781    21  1466771    135   333762      159
               SYS305   402200    22  1463352     98   354982       81
               SYS306   571072    31  1294480     65   513361       49
               SYS307   385102    21  1480450    104   321114       56
               SYS308   385805    21  1479747    237   156927       83
               SYS309   367068    20  1498484     88   326173       60

USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 9. ISMF—End User Short Error Message

Identifying an ISMF Error Message:

1. To determine whether ISMF or ISPF issued the error message, press the HELP key or enter the HELP command. The system displays a long message related to the original short error message. Figure 10 is an example of an end-user ISMF panel with the long error message:

   ```
   COMPRESS terminated with a return code of 12
   ```

   ISPF long messages have the same format.

```
                                VOLUME LIST                    COMPRESS FAILED
COMMAND ===> COMPRESS                                         SCROLL ===> HALF
COMPRESS terminated with a return code of 12
ENTER LINE OPERATORS BELOW:                                Data Columns 3-8 of 39

    LINE       VOLUME  FREE     %     ALLOC    FRAG   LARGEST  FREE
    OPERATOR   SERIAL  SPACE    FREE  SPACE    INDEX  EXTENT   EXTENTS
   ---(1)----  -(2)--  --(3)--  (4)-  --(5)--  -(6)-  --(7)--  --(8)--
   ?COMPRESS   SCR001  1342355    72   523197    122   793299       25
               SCR002  1113616    60   751936     25  1067335       15
               SCR003  2835621    99    39669      1  2830511        4
               SCR004  2859732    99    15558      1  2856345        3
               SYS300   353342    19  1512210    270   164468      109
               SYS301   363133    19  1502419    113   311792       79
               SYS302   396767    21  1468785    224   165312       72
               SYS303   345098    18  1520454    234   254689      264
               SYS304   398781    21  1466771    135   333762      159
               SYS305   402200    22  1463352     98   354982       81
               SYS306   571072    31  1294480     65   513361       49
               SYS307   385102    21  1480450    104   321114       56
               SYS308   385805    21  1479747    237   156927       83
               SYS309   367068    20  1498484     88   326173       60

USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 10. ISMF—End User Long Error Message

2. Press the HELP key again to see the help panel for the short and long messages. The help panel further explains the problem. Figure 11 is an example of an ISMF message help panel.

```
HELP-----------------------------ISMF MESSAGE-----------------------------HELP
COMMAND ===>

   MESSAGE NUMBER:  DGTUS009

   SHORT MESSAGE:   COMPRESS FAILED

   LONG MESSAGE:
 COMPRESS terminated with a return code of 12

   EXPLANATION:
      The messages above were issued by ISMF. The command or line
      operator was not successful.

   SUGGESTED ACTION:
      The above messages should indicate the return code issued for the
      line operator of command. For additional information refer to
      documentation appropriate to specific command. If you need further
      assistance contact your system programmer or your IBM customer
      representative for assistance.


  Use ENTER to continue with ISMF HELP, Use END to return to ISMF.
```

Figure 11. ISMF—Message HELP Panel

ISMF message identifiers begin with the prefix DGT. ISPF message identifiers begin with ISP or ISR. On the help panel, the message identifier is in the MESSAGE NUMBER field, located at the upper left.

3. If ISMF issued the message, follow the procedure in “Messages Issued by ISMF” on page 30 to build the message type-of-failure keyword.
4. If ISPF issued the message, read the help panel to determine whether there is something you can do to resolve the problem.
5. If the help panel does not indicate how to correct the error, see *z/OS ISPF Messages and Codes*.

Messages Issued by Other Subcomponents

1. Record on the “Keyword Worksheet” on page 5 the message that interrupted the ISMF operation screen. For an example, see Figure 8 on page 27.
2. Press the ENTER key to get the ISMF short error message. For an example, see Figure 9 on page 27.
3. Enter HELP to get the ISMF long error message. For an example, see Figure 10 on page 28.
4. Enter HELP again to get the help panel that defines the problem further. For an example, see Figure 11.

   Read the help panel to determine if you can do something to resolve the problem. If the explanation provided does not indicatehow to correct the error, continue with this procedure.
5. Examine the ISPF log for the message identifier. (See the section on ISMF’s use of the ISPF log in *z/OS DFSMSdfp Diagnosis Reference* for an example of the ISPF log.) The message identifier appears with the original error message. A list of possible three-letter prefixes for messages issued by some other product appears in Table 4 on page 30.

6. If the message starts with any of these prefixes, use the manual indicated in Table 4 to determine the recommended action. For messages that start with other prefixes, see *z/OS MVS System Messages, Vol 1 (ABA-AOM)*, through *z/OS MVS System Messages, Vol 10 (IXC-IZP)*, to determine the recommended action.

Table 4. ISMF—Message Prefixes for Other Products

Prefix	Subcomponent Name	Manual Name
ADR	DFSMSdss	*z/OS MVS System Messages, Vol 1 (ABA-AOM)*
ARC	DFSMShsm	*z/OS MVS System Messages, Vol 2 (ARC-ASA)*
DFQ or DGT	ISMF	(User response options are given on message panel.)
ICK	ICKDSF	*Device Support Facilities User's Guide and Reference*
IKJ	TSO/E	*z/OS MVS System Messages, Vol 9 (IGF-IWM)*
ISP or ISR	ISPF	*z/OS ISPF Messages and Codes*

7. If the message has no message identifier, issue the TSO PROFILE command specifying the keyword 'MSGID' and retry the failing function.
8. See "Chapter 12. ISMF—Module Keyword" on page 53.

Messages Issued by ISMF

1. Read the help panel to determine if you can do something to resolve the problem. If the explanation provided does not indicate how to correct the error, continue this procedure.
2. Build the message keyword by appending the message identifier to the keyword prefix MSG.

   Example: If the message identifier is DGTMD006, specify the message type-of-failure keyword as follows:

   ```
   MSGDGTMD006
   ```

   If ISPF logging was in effect when the message was issued, specify the return code and reason code related to the message exactly as the system presents them. Continue with Step 3.

   If ISPF logging was not in effect when the message was issued, the type-of-failure keyword is complete. See "Chapter 12. ISMF—Module Keyword" on page 53.
3. If the ISPF log was turned on when the message was issued, you must specify the message-related return code and reason code. To determine the return code and reason code, examine the ISPF log for the entry associated with the message identifier. (See the section on ISMF's use of the ISPF log in *z/OS DFSMSdfp Diagnosis Reference* for a description of the ISPF log.) Record the return code and reason code exactly as they appear in the log, on the "Keyword Worksheet" on page 5 as modifier keywords.
4. See "ISMF—Modifier Keywords" on page 77.

Object Access Method—Message Keyword

Use this section for OAM-related failures.

Non-OAM Components—Message Keywords

This section is for messages that contain OAM information only. The OAM component does not issue these messages.

Whereas messages issued by OAM have the prefix CBR, software applications that use OAM services issue their own messages while referring to OAM processing information.

The following are valid message keywords:

- External return code keyword prefix: The characters XRC, to which each external OAM return code is appended.
- External reason code keyword prefix: The characters XRSN, to which each external OAM reason code is appended.

Example: Suppose the message is the following one:

```
ECK0703E  OAM ERROR OCCURRED ON OBJECT objectname MODERR:
          modname RETCODE: 12 REACODE: 20
          XRETCODE: 16 XREACODE: A0020D00
```

Specify the keyword string as follows:

```
MSGEKC0703E RC12 RSN20 XRC16 XRSNA0020D00
```

OAM passes the return, reason, external return, and external reason codes to the application code that uses OAM services. These codes are in the syslog or in an application log. For more information, refer to *z/OS DFSMSdfp Diagnosis Reference*.

Storage Management Subsystem—Message Keyword

Use this section for problems related to Storage Management Subsystems.

Procedure

Before using this section, examine *z/OS MVS System Codes* and *z/OS MVS System Messages, Vol 1 (ABA-AOM)*, through *z/OS MVS System Messages, Vol 10 (IXC-IZP)*. These might help you generate additional keywords by identifying failure-related functions and providing message-to-module cross-reference tables.

See “Definition of Message Keyword Related Terms” on page 23 for definitions of the following terms used in this section:

- Message identifier
- Message keyword prefix
- Return or reason code
- Return or reason code keyword prefix

Storage Management Subsystem—Message Keyword

Message IGD300I

This message always accompanies an SMS abend. If SMS cannot find the SDWA and recover, message IGD312I might appear. This message usually does not appear.

1. Figure 12 shows a sample SMS abend-related job log, which always contains message IGD300I.
2. Because this message reports an abend type-of-failure, do not specify the message identifier as a keyword. See “Procedure for SVC Dump” on page 12 and use that section to identify the failure-related keywords.

```
*****************************************************
                 J E S 2  J O B  L O G  --  S Y S T E M  3 0 8 1  --  N O D E  N 1
07.39.08 JOB   29  $HASP373 S2RAS031 STARTED - INIT  1 - CLASS A - SYS 3081
07.40.13 JOB   29      S2RAS031    STEP 0      IKJEFT01    0000
07.40.19 JOB   29  DFPWTX30 ISSUING COMMAND.
07.40.20 JOB   29 *41 S2RAS031--REPLY GO STEP1
07.40.46 JOB   29  R 41,U
07.40.52 JOB   29      S2RAS031    STEP1       WTORPGM     0000
07.42.31 JOB   29      S2RAS031    STEP2       AMBLIST     0000
07.42.58 JOB   29      S2RAS031    STEP2       AMBLIST     0000
                   IGD300I AN ABEND OCCURRED DURING SMS PROCESSING
                     ABEND SYSTEM CODE=06F ASID=0010
                     COMPONENT NAME=SMS  COMPONENT ID=28462
                     ACTIVE LOAD MODULE  NAME=IGDZILLA ADDRESS=01BE1000
                     CSECT IN ERROR      DESCRIPTION=BUILD MSG RTN 2
                                         NAME=IGDMCSC2 ADDRESS=01BF5758 OFFSET=00000026
                                         ASSEMBLY DATE=032487   PTF LEVEL=HDP3310
                     PSW AT TIME OF ERROR 071C0000 81BF577E
                     DATA AT PSW 01BF5778 - C5404040 400090EC D00C18CF
                     GPR  0-3  008C7444  7F70FC78  00000010  00000000
                     GPR  4-7  00000018  7F70FD10  7F70F434  7F70FD14
                     GPR  8-11 7F70FDD8  01BF58B2  01BF48B3  7F70FAB0
                     GPR 12-15 81BF38B4  7F70FAB0  81BF41B6  81BF5758
07.43.03 JOB   29  IGD306I UNEXPECTED ERROR DURING IGDMCSCN PROCESSING
                   RETURN CODE IS 8, REASON CODE IS 12008
                   THE MODULE THAT DETECTED THE ERROR IS IGDMCSCN
                   SMS MODULE TRACE BACK - MCSCM DSP00 SSIRT
                   SYMPTOM RECORD CREATED, PROBLEM ID IS IGD00025
07.43.04 JOB   29      S2RAS031    STEP3       IGDRAS00    0000
07.43.04 JOB   29  $HASP395 S2RAS031 ENDED
```

Figure 12. Sample SMS Failure Related Job Log Output

Storage Management Subsystem—Message Keyword

Message IGD306I

This message indicates that an SMS failure has occurred and that SMS has written a symptom record to SYS1.LOGREC.

1. Print SYS1.LOGREC to obtain structured search keyword information. See *EREP User's Guide* for instructions on how to print SYS1.LOGREC. See the sample record in the section that describes SMS records written to SYS1.LOGREC in *z/OS DFSMSdfp Diagnosis Reference*. Use these keywords as the complete keyword string.
2. See "Searching with the Keyword String" on page 2.

If the CSECT IN ERROR is not an SMS load module or CSECT, then SMS detected an error from a component or subcomponent that was called to perform a service. The return and reason codes might also belong to the called component or subcomponent.

SMS return and reason codes are in the *z/OS DFSMSdfp Diagnosis Reference*. Errors returned from the called component or subcomponent should be pursued with that component or subcomponent. Use Table 5 to help identify the failing component or subcomponent.

Note: The called components or subcomponents might issue messages preceding the IGD306I message. These initial messages can describe the error.

Storage Management Subsystem—Message Keyword

Table 5. Components or Subcomponents Called by SMS.

CSECT IN ERROR Name or Prefix	Component or Subcomponent	Book Name
AOM	Asynchronous Operations Manager (AOM)	*z/OS DFSMSdfp Diagnosis Reference*
CATALOG or IGG0CL	Catalog (SVC 26)	*z/OS MVS System Messages, Vol 8 (IEF-IGD)* (IGD3009I) *z/OS DFSMSdfp Diagnosis Reference*
CBR	Object Access Method (OAM)	*z/OS DFSMSdfp Diagnosis Reference*
DEVINFO	Device Information Services	*z/OS DFSMSdfp Diagnosis Reference*
DEQUEUE or DEQ	DEQUEUE	*z/OS MVS Programming: Authorized Assembler Services Reference ALE-DYN*
DIV	Data in virtual	*z/OS MVS Programming: Authorized Assembler Services Reference ALE-DYN*
ENQUEUE or ENQ	ENQUEUE	*z/OS MVS Programming: Authorized Assembler Services Reference ENF-IXG*
GETMAIN	GETMAIN	*z/OS MVS Programming: Authorized Assembler Services Reference ENF-IXG*
IEFAB, SVC99 or SVC_99	Dynamic Allocation (SVC 99)	*z/OS MVS Programming: Authorized Assembler Services Reference ALE-DYN*
IEFSJRTE or SJF	Scheduler JCL Facility (SJF)	*z/OS MVS Programming: Authorized Assembler Services Guide*
IGGDA	Direct Access Device Space Management (DADSM)	*z/OS DFSMSdfp Diagnosis Reference*
IGW	Buffer Manager Facility (BMF) or System Support Facilities (SSF)	*z/OS DFSMSdfp Diagnosis Reference*
RAC or SAF	Resource Access Control Facility (RACF®, a component of the Security Server for z/OS) or System Authorization Facility (SAF)	*z/OS MVS Programming: Authorized Assembler Services Guide*
SWAREQ	SWAREQ macro	*z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO*

Storage Management Subsystem—Message Keyword

Message IGD311I

This message reports the same condition as IGD306I, except that SMS was unable to write a symptom record to SYS1.LOGREC.

1. Record the module in error, the return code, and the reason code as keywords.

   The failure to write a symptom record to SYS1.LOGREC is usually unrelated to the problem for which the record was being written. Message IGD311I also contains the return and reason codes from the unsuccessful attempt to write the SYS1.LOGREC record. Do not specify these codes in the keyword string.
2. If you want to do a keyword search for the failure to write to SYS1.LOGREC, do not include the failing module name, return code, or reason code associated with the original failure. Specify only the message identifier, return code, and reason code related to the SYS1.LOGREC write failure.
3. If you want to do a keyword search for the original failure, specify the original failure-related module name, return code, and reason code.
4. See “Chapter 18. Modifier Keywords” on page 67.

VSAM and VSAM RLS Record Management—Message Keyword

VSAM record management does not issue any messages directly. However, the results of a record management request can be translated into a message that the user of record management issues. Use this section when your program or the system indicates that a VSAM data set is being processed.

Before using this section, examine *z/OS MVS System Codes* and *z/OS MVS System Messages, Vol 1 (ABA-AOM)*, through *z/OS MVS System Messages, Vol 10 (IXC-IZP)*. These might help you generate additional keywords because they identify failure-related functions and provide message-to-module cross-reference tables.

See “Definition of Message Keyword Related Terms” on page 23 for definitions of the following terms used in this section:

- Message identifier
- Message keyword prefix
- Return or reason code
- Return or reason code keyword prefix

Procedure

1. A damaged data set can cause one of the following messages to be issued by the caller of VSAM record management or by a system service routine (for example, EOV or IOS) that was invoked by record management:
   - MSGIDC3302I—Action error
   - MSGIDC3308I—Duplicate records
   - MSGIDC3314I—Out-of-sequence records, missing records, duplicate records, no record found
   - MSGIDC3351I—VSAM logic I/O error RC156, RC24, or RC32
   - MSGIDC3350I—No record found or incorrect length
   - MSGIEC070I—RC32, RC202, RC104, or RC203
   - MSGIOS000I—Command reject
2. If the system issues one of these messages while processing a key-sequenced data set (KSDS), determine whether you have a damaged data set. Issue the IDCAMS EXAMINE command as described in the chapter on functional command format in *z/OS DFSMS Access Method Services* and the chapter on checking a VSAM key-sequenced data set cluster for structural errors in *z/OS DFSMS: Using Data Sets*. The EXAMINE command provides details about the nature of data set damage.

   Example: If a damaged data set caused message IDC3302I to be issued, specify the message type-of-failure keyword as follows:

   ```
   MSGIDC3302I
   ```
3. See “Chapter 18. Modifier Keywords” on page 67.

Chapter 6. Incorrect Output Keyword

Use this section when a program or the system does not produce the expected output.

Symptoms of the Failure

Incorrect output failures can be identified by the following:

- Expected output is missing.
- Output is different than expected.
- Output should not have been generated.
- System indicates damage to the VTOC or VTOC index.
- ISMF panel information or flow is erroneous.

Incorrect output can be the result of a previous failure and can often be difficult to analyze because the component affected might not be the one that caused the problem. Review previous messages, abends, console logs, or other system responses. They could indicate the source of the failure.

Procedure

1. If a message accompanied the failure, append the message identifier to the prefix MSG according to the procedures starting on “Chapter 5. Message Keyword” on page 23 and add this keyword to the keyword string. If the system did not issue a message, try to identify any failure-related control blocks, user areas, or data records and record them on the “Keyword Worksheet” on page 5 as modifier keywords.

   Specify the incorrect output keyword as INCORROUT.
2. If the system indicates damage to the VTOC or VTOC index, then DADSM or CVAF normally issues an error message. In this case, examine the “Standard Modifier Keyword List” on page 68 and go to the DADSM/CVAF-related “Incorrect Output Failure Modifier Keywords Procedure” on page 74 to identify applicable symptom keywords. If VTOC problems are not indicated, continue with this procedure.
3. Accumulate as much of the following information as possible. It can help you isolate or resolve your problem, and the IBM Support Center will request it if trap or trace information is needed.
   - When was the problem first noticed?
   - How was the problem identified (good output versus bad output)?
   - Were any system changes or maintenance recently applied? For example, a new device, software product, APAR, or PTF?
   - Does the problem occur with a specific data set, device, time of day, and so forth?
   - Does the problem occur in batch or in TSO mode?
   - Is the problem solid or intermittent?
   - Can the problem be re-created?

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4. Select the procedure for the failure-related component from the following table.

Subcomponent	Procedure
Catalog Management	See “Catalog Management—Incorrect Output Keyword” on page 42
Device Console Services	See “Device Console Services—Incorrect Output Keyword”
ISMF	See “ISMF—Incorrect Output Keyword” on page 39
Media Manager	See “Media Manager—Incorrect Output Keyword” on page 39
O/C/EOV (Common)	See “OPEN/CLOSE/End-of-Volume (Common)—Modifier Keywords” on page 82
Storage Management Subsystem (SMS)	See “Storage Management Subsystem—Incorrect Output Keyword” on page 40
VSAM Block Processor or Record Management	See “VSAM Record Management/Block Processor—Incorrect Output Keyword” on page 40
All Other DFSMSdfp Subcomponents	See “Other DFSMSdfp Subcomponents—Modifier Keywords” on page 87

Device Console Services—Incorrect Output Keyword

Use this section when your program or the system produces other than the expected output and you suspect a failure in device console services.

Procedure

1. If the DEVSERV command causes the issuance of messages that contain incorrect information, specify the incorrect output type-of-failure keyword as INCORROUT.
2. Record the DEVSERV command-line parameters as modifier keywords on the “Keyword Worksheet” on page 5.
3. The message text might contain additional information that you can use as modifier keywords (function, subfunction, device-related information, and so forth); record it on the “Keyword Worksheet” on page 5.
4. See “Chapter 17. Other DFSMSdfp Subcomponents—Module Keyword” on page 65.

ISMF—Incorrect Output Keyword

Use this section to determine the required action if an incorrect output condition occurs with an ISMF panel.

Procedure

Before reporting an ISMF panel problem, ensure that the incorrect output is not the result of a customized panel or message. If the panel is modified, retry the operation with the IBM-supplied copy. If the failure still occurs, continue with the following procedure:

1. For minor panel errors (spelling, punctuation, or grammar), submit an ISMF Panel Comment Form from the back of this publication.

   Restriction: IBM does not accept APARs for minor panel errors (spelling, punctuation, or grammar).
2. For other panel problems or panel function errors, specify the incorrect output type-of-failure keyword as INCORROUT.
3. See “ISMF—Modifier Keywords” on page 77.

Media Manager—Incorrect Output Keyword

Use this section when the system produces other than the expected output and you suspect a failure in the media manager.

The media manager processes read and write requests from the following subcomponents for the types of records indicated.

Subcomponent	Record Type
CVAF	Indexed VTOC records contained in the SYS1.VTOCIX data set
Catalog	VVDS records contained in the SYS1.VVDS data set
DB2®	DB2 records contained in the DB2 table/index spaces, and the DB2 log data set
IMS Fast Path	IMS records contained in the IMS data entry database.

Incorrect output could be the result of a previous failure.

Procedure

1. If the media manager provides output that is missing or different than expected, the subcomponent that requested services from the media manager issues an explanatory message. If this occurs, specify the message keyword as the type-of-failure keyword instead of INCORROUT, and continue below. If no such message is issued, specify INCORROUT as the type-of-failure keyword and see “Chapter 9. Module Keyword” on page 47.
2. Try to identify any significant failure-related keywords that appear in the message prefix, number, or text. Record them as modifier keywords on the “Keyword Worksheet” on page 5 for use in the software support database search.
3. See “Chapter 9. Module Keyword” on page 47.

Storage Management Subsystem—Incorrect Output Keyword

Use this section when the output of an SMS command or SMS-related function is incorrect. SMS-related processing includes:

- SMS operator commands
- ACS processing

Procedure

1. If the incorrect output includes a message, see “Chapter 5. Message Keyword” on page 23 and describe the problem as a message type-of-failure, but include the INCORROUT keyword in the keyword string.
2. Identify the failure-related SMS function, for example, which SMS command was issued, which SMS class was assigned, and so forth.
3. See “Storage Management Subsystem—Modifier Keywords” on page 83.

VSAM Record Management/Block Processor—Incorrect Output Keyword

Use this section to gather detailed information about an incorrect output type-of-failure related to either the VSAM block processor or VSAM record management.

Incorrect output could have been caused by a previous failure. Examine the system and console logs for failure-related abends, messages, or return codes. A damaged VSAM data set can also cause incorrect output. Add any failure-related return codes to the keyword string, exactly as the system presents them. You can also add the abend or message type-of-failure keywords to the incorrect output keyword string to define the symptoms more closely.

Procedure

1. Determine whether failure-related record management return codes and reason codes exist.

   VSAM provides return codes in register 15 and reason codes in either the access method control block (ACB) or the request parameter list (RPL). Reason codes in the ACB indicate VSAM open or close errors. Reason codes in the RPL indicate VSAM record management error indications returned to the caller of record management. Reason codes returned to the caller of record management in the RPL indicate VSAM record management errors.
2. Record any failure-related RPL feedback word (a hexadecimal full word) and RPL return code on the “Keyword Worksheet” on page 5 as modifier keywords. The IBM Support Center can use these values to identify a failure-related module and the nature of the incorrect output.

   Example: If the RPL feedback word is X'000C0010', specify the following keywords:

   ```
   RPLFDBWD 000C0010
   ```

3. Determine whether you have a damaged VSAM data set.

   Some incorrect output failures involve a damaged VSAM data set. To determine whether you have a damaged data set, use the IDCAMS EXAMINE command as described in the chapter on functional command format in *z/OS DFSMS Access Method Services* and the chapter on checking a VSAM key-sequenced data set cluster for structural errors in *z/OS DFSMS: Using Data Sets*. The EXAMINE command provides details about the nature of data set damage.

   If these service aids indicate that the data set is not damaged, inform the IBM Support Center if you call for assistance. If they indicate that the data set is damaged, keep a copy of the output for possible use by the IBM Support Center. Be prepared to describe the type of data set damage. You should attempt to recover the data set and rerun the failing job to determine whether the problem is resolved.

   The system can indicate a damaged data set by one of the following:
   - Messages (discussed in Message section)
   - ABEND0C4 (discussed in ABEND section)
   - Wait/Loop (discussed in Wait/Loop section)
   - RPL feedback word: *nn*X'08'*nn*X'9C' or *nn*X'08'*nn*X'20'

4. If the data set is damaged, rebuild it as directed in the section that describes VSAM record management damaged data sets in *z/OS DFSMSdfp Diagnosis Reference*, and rerun the job.
5. See “Chapter 18. Modifier Keywords” on page 67.

Catalog Management—Incorrect Output Keyword

Use this section to define the keyword when the system produces other than the expected output and you suspect a failure in the catalog management area.

Procedure

Determine the extent of the incorrect output.

1. Use the LISTCAT command as described in the chapter on functional command format in *z/OS DFSMS Access Method Services* to obtain a complete listing of the catalog.
2. Use the IEHLIST program as described in *z/OS DFSMSdfp Utilities* to obtain a listing of the VTOC. This might be useful when diagnosing problems in managing DASD volume space or in using access method services commands.
3. Use the DIAGNOSE command as described in the chapter on functional command format in *z/OS DFSMS Access Method Services* to determine whether a catalog structure is correct. Include any reason codes produced by DIAGNOSE in your search argument.

   Example: If the reason code is 23, specify it as follows:

   ```
   DIAGNOSE   RC23
   ```

4. Use the IDCAMS EXAMINE command as described in the chapter on functional command format in *z/OS DFSMS Access Method Services* and the chapter on checking a VSAM key-sequenced data set cluster for structural errors in *z/OS DFSMS: Using Data Sets* to determine whether the catalog being used has been damaged and the nature of any damage.

   If the output of these service aids (LISTCAT, IEHLIST, DIAGNOSE, or EXAMINE) indicates that the catalog is not damaged, inform the IBM Support Center if you call for assistance. If they indicate that the catalog is damaged, keep a copy of the output for possible use by the IBM Support Center. Be prepared to describe the type of catalog damage. You should attempt to recover the catalog and rerun the failing job to determine whether the problem is resolved.
5. See “Catalog Management—Modifier Keywords” on page 86.

Chapter 7. Performance Keyword

Use this section to define the performance keyword when you suspect that a DFSMSdfp component or subcomponent is causing poor system performance.

Performance Failure Definition

Performance is defined as a measurement of either work or time:

- System-related work accomplished within a given time
- The time required to complete a task or job, based upon past performance.

Many performance problems are related to system tuning.

Modifications to your system or its environment can influence system performance. Consult with IBM for system tuning assistance.

Procedure

1. Use the performance keyword only when tuning cannot improve system performance tuning and performance is below explicitly stated expectations.
2. Record actual performance, expected performance, and the source of the expected performance criteria. Include the order number and page of the source document. If you contact the IBM Support Center, you will be asked for this information.
3. Specify the performance keyword as PERFM.
4. If the problem is related to a function or module, specify the function or module name as a modifier keyword.

   Example: If the module is IFG0194A and the function is OPEN, specify the keywords as follows:

   ```
   IFG0194A OPEN
   ```
5. If possible, isolate the probable source of degraded performance to a specific DFSMSdfp subcomponent.
6. See Table 22 on page 89.

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Performance Keyword

Chapter 8. Documentation Keyword

Use this section when you encounter incorrect or missing information in a DFSMSdfp publication.

Procedure

For a minor publication error, submit a Reader's Comment Form from the back of the publication in error. If the error is serious and of general concern to other users, continue with the procedure below.

Restriction: IBM does not accept APARs for minor publications errors (spelling, punctuation, or grammar).

1. Record the document page in error. Be prepared to describe the error and the problem it caused.
2. Specify the order number of the document after the prefix DOC, omitting the hyphen and level number.

   Example: If the order number is LY26-3959-0, specify the type-of-failure keyword as follows:

   ```
   DOC LY263959
   ```

3. For documentation problems related to a system message, append the message identifier to the keyword prefix MSG, add it to the keyword string as a modifier keyword.

   Example: If the message is IEC147I, specify the modifier keyword as follows:

   ```
   MSGIEC147I
   ```

4. For problems related to a function or module, specify the function or module name as a modifier keyword.

   Example: If the module is IFG0194A and the function is OPEN, specify the modifier keywords as follows:

   ```
   IFG0194A OPEN
   ```

5. See "Searching with the Keyword String" on page 2.

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Documentation Keyword

Chapter 9. Module Keyword

Use this section to build the module keyword for your keyword string. This keyword identifies the failure-related Control Section (CSECT). A load module consists of one or more individually replaceable CSECTs.

The CSECT name describes the area of suspected failure more precisely than the load module name, but you can specify either or both when varying the keyword string during the software support database search.

Procedure

- If the system has given some indication of a failure-related module in SVCDUMP TITLE, LOGREC RECORD, DUMP SUMMARY PAGE, or MESSAGES output, specify the complete module name as the module keyword and see “Chapter 18. Modifier Keywords” on page 67.
- You should be able to infer the probable failing component from a failure-related indication (such as a message or unique abend code).
- If you have a dump that contains the nucleus and LPA, select the procedure for the failure-related component indicated in Table 6.
- For some failures, you might find it impossible to identify a probable failing module. In this case, select the procedure for the failure-related component from Table 6.

Table 6. Building the Module Keyword

Subcomponent	Procedure
Catalog Management	See “Chapter 16. Catalog Management—Module Keyword” on page 63.
DADSM/CVAF	See “Chapter 10. DADSM/CVAF—Module Keyword” on page 49.
DASD Common Services	See “Chapter 11. DASD Common Services—Module Keyword” on page 51.
ISMF	See “Chapter 12. ISMF—Module Keyword” on page 53.
Media Manager	See “Chapter 13. Media Manager—Module Keyword” on page 57.
OPEN/CLOSE/End-of-Volume	See “Chapter 14. OPEN/CLOSE/End-of-Volume (Common)—Module Keyword” on page 59.
SAM	See “Chapter 15. SAM—Module Keyword” on page 61.
All other DFSMSdfp subcomponents	See “Chapter 17. Other DFSMSdfp Subcomponents—Module Keyword” on page 65.

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Chapter 10. DADSM/CVAF—Module Keyword

Use this section to build the module keyword for either the DADSM or CVAF subcomponents.

Procedure

Use either of the following procedures.

Abend or Wait/Loop Type-of-Failure

1. For ABEND types-of-failure, the system might have issued message `IEC999I`, identifying the module in which the error occurred. If this occurs, go to Step 5 to determine if it is a DADSM module.
2. Using the PSW from the formatted part of the dump obtained earlier, or from the symptom dump (summary) information in the system job log, extract the data in the last four bytes of the PSW. These bytes contain the address of the instruction that follows the last instruction executed before the abend.
3. Using a map of the LPA and the instruction address, identify the name of the module that was in control when the abend occurred.
4. If the module name begins with the letters ICV, CVAF is the failing component. Locate the CVAF module name in the section on CVAF module-to-function cross reference in *z/OS DFSMSdfp Diagnosis Reference* and record the related function and subfunction on the “Keyword Worksheet” on page 5 as modifier keywords.

   Example: If the module name is ICVCMB00, specify the keyword as follows:

   ```
   ICVCMB00
   ```

   - For ABEND types-of-failure, see “DADSM/CVAF—Modifier Keywords” on page 71. For WAIT or LOOP types-of-failure, see “Chapter 20. Release Level Keyword” on page 93.
5. The section on DADSM module-to-function cross-reference in *z/OS DFSMSdfp Diagnosis Reference* contains a complete list of DADSM module names and their related functions and subfunctions. If the module name you identified in Step 1 or Step 3 is in the list, the subcomponent is DADSM. Record the function and subfunction on the “Keyword Worksheet” on page 5 as modifier keywords.

   Example: If the module name is IGC0002G, specify the keyword as follows:

   ```
   IGC0002G
   ```

   - For ABEND types-of-failure, see “DADSM/CVAF—Modifier Keywords” on page 71. For WAIT or LOOP types-of-failure, see “Chapter 20. Release Level Keyword” on page 93.
6. Use the Component Identification Keyword 5695DF107 to develop a keyword string for the DADSM/CVAF subcomponents. Include the suspected module name in the keyword string. The problem might have been previously reported with the same module name. Code the string as follows:

   ```
   5695DF107 ABEND0C4 ICVCMB00
   ```

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DADSM/CVAF—Module Keyword

If the search keyword string does not yield usable results, and if the error might exist outside this component, you can broaden the search by deleting the component identification keyword. Build a keyword string containing only the abend code and the module name as:

```
ABEND0C4 ICVCMB00
```

This keyword string might yield a previously reported problem (and its fix) in some subcomponent other than DADSM/CVAF.

- For ABEND types-of-failure, see “DADSM/CVAF—Modifier Keywords” on page 71. For WAIT or LOOP types-of-failure, see “Chapter 20. Release Level Keyword” on page 93.

Message Type-of-Failure

1. Specify the module keyword by using the DADSM or CVAF module name identified at “DADSM/CVAF—Message Keyword” on page 24.

   Example: If the module name is IGG020P2, specify the module keyword as follows:

   ```
   IGG020P2
   ```

2. See “DADSM/CVAF—Modifier Keywords” on page 71.

Chapter 11. DASD Common Services—Module Keyword

Use this section to build the module keyword for the DASD common services subcomponent. This keyword identifies the module related to a failure which results in the unsuccessful execution of one of the services.

Procedure

You can determine the name of the module that detected the error by using the problem determination area (PDA), except for common filter services, which neither employ an ESTAE nor use a PDA.

The failure-related ISPF log entry's FEEDBACK field contains the PDA information. See the first entry in the sample ISPF log in the ISMF diagnostic aids section of *z/OS DFSMSdfp Diagnosis Reference* for a sample entry containing PDA information. See the DASD common services problem determination area (PDA) section of *z/OS DFSMSdfp Diagnosis Reference* for a description of the PDA contents.

1. Use the module name identified in the PDA as the module keyword.
2. Record any other significant keywords on the "Keyword Worksheet" on page 5 with prefixes applicable to their nature. (For example, specify the return code as RC*nn*.)

Building the Module Keyword

1. **Example**: If the module name is IGBDIS01, specify the module keyword as `IGBDIS01.`
2. See "DASD Common Services—Modifier Keywords" on page 76.

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Chapter 12. ISMF—Module Keyword

For an abend type-of-failure, continue with the following procedure.

For all other types-of-failure, see “ISMF—Modifier Keywords” on page 77.

Procedure

You can determine the name of the failing module for an abend in several ways, depending on how the system indicated the failure and the conditions under which you invoked ISPF and ISMF. Table 7 summarizes abend processing. To determine the module name, go to the section indicated under the “Type of Dump” column.

Table 7. Summary of ABEND Processing

ISPF Mode	ISMF Profile	Abend Indicator	Type of Dump
Normal	RECOVER FROM ABENDS ===> Y	ISMF abend panel	ISMF symptom dump, see “Using the ISMF Symptom Dump”
Normal	RECOVER FROM ABENDS ===> N	ISPF abend panel	ISPF symptom dump, see “Using the ISPF Symptom Dump” on page 54
Test/Trace	RECOVER FROM ABENDS ===> Y	ISMF abend panel	ISMF symptom dump, see “Using the ISMF Symptom Dump”
Test/Trace	RECOVER FROM ABENDS ===> N	TSO/E error message	System abend dump, see “Using the Abend Dump” on page 54

See the section on determining how ISMF handles abends and takes dumps in *z/OS DFSMSdfp Diagnosis Reference* for information on controlling logging and dumps.

Using the ISMF Symptom Dump

If an abend occurs while executing ISMF, and logging is active, the system places an ISMF symptom dump (mini dump) in the ISPF log. If ISMF is able to capture the name of the failing module, it appears in the symptom dump. The format of the dump is shown in Figure 13.

```
14:32   *****  ISMF ERROR  ***** - APPLICATION(DGTA - LIBRARY); FUNCTION(DEFINE)
14:32                           - WORK.SCDS
14:32                           - ISMF 1.1.0   FMID JDZ1110   SYSTEM ABEND CODE 0C1
14:32                           - XXXXXX NAME DGTFLCDA   EPA 8260D5F8   PSW 078D2000 8000002A
14:32                           - DATA AT PSW 00000022 - 1000822E 3488078D 20008262 631E0000
14:32                           - R0  00000000   R1  0270A554   R2  026E6618   R3  000535E0
14:32                           - R4  00041698   R5  00000000   R6  000535E0   R7  00056800
14:32                           - R8  0270A56C   R9  026F98E7   R10 026E813C   R11 0270A4CC
14:32                           - R12 8260D5F8   R13 0270A4CC   R14 8260D750   R15 00000000
```

Figure 13. ISMF—Symptom Dump in the ISPF Log

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ISMF—Module Keyword

The name field in the symptom dump identifies the name of the failing module if it is available.

1. If you can determine the module name from the symptom dump:
   a. Use the module name as the module keyword.

      Example: If the module name is DGTFLCDA, specify the module keyword as shown:

      ```
      DGTFLCDA
      ```

   b. See “ISMF—Modifier Keywords” on page 77.
2. If you cannot determine the module name from the symptom dump:
   a. Continue with the procedures for determining the module name described in “Using the Abend Dump”.
   b. If you still cannot determine the module name, see “ISMF—Modifier Keywords” on page 77.

Using the ISPF Symptom Dump

If the ISMF profile variable indicates that ISMF is not to recover from abends, and ISPF is executing in normal mode, the system displays an ISPF abend panel and places an ISPF symptom dump in the ISPF log. See the sample ISPF log in the ISMF diagnostic aids section of *z/OS DFSMSdfp Diagnosis Reference* for a description of the ISPF log. The format of the ISPF symptom dump is shown in Figure 14.

```
14:45      ISP SUBTASK ABEND     - VS 03.8 ISP 3.3.0000  ABEND CODE = 00007A PSW  FF85000D 00000000
14:45                            - NAME  EPA 01C8DB00  ISPSUBS EPA 81C01F88 ISPTBLS EPA 000236B0
14:45      REGISTERS AT          - R0  80000000  R1  8000007A  R2  01CE2668  R3  00000001
14:45      ENTRY TO              - R4  00000001  R5  01CC0D28  R6  00027CB8  R7  00030B10
14:45      ABEND                 - R8  00000000  R9  0002E7A0  R10 01C6A304  R11 01CE3B24
14:45                            - R12 80036534  R13 0002E7A0  R14 8003675C  R15 00000000
```

Figure 14. ISPF Symptom Dump in the ISPF Log

The name field in the symptom dump identifies the name of the failing module if it is available.

1. If you can determine the module name from the symptom dump:
   a. Use the module name as the keyword.

      Example: If the module name is DGTFLCDA, (this is not the case in the sample ISPF symptom dump shown in Figure 14 above), specify the module keyword as:

      ```
      DGTFLCDA
      ```

   b. See “ISMF—Modifier Keywords” on page 77.
2. If you cannot determine the module name from the symptom dump:
   a. Continue with the procedures for determining the module name described in “Using the Abend Dump”. If you still cannot determine the module name, see “ISMF—Modifier Keywords” on page 77.

Using the Abend Dump

When the symptom of the failure is a TSO/E error message, use the save area trace section of the SYSUDUMP to determine the name of the failure-related module. See Figure 15 for a sample save area trace.

```
SAVE AREA TRACE

DGTFMD01 WAS ENTERED VIA LINK         AT EP DGTFMD01..90.349
SA   0002EFD8  WD1 000000D0   HSA 0002E818   LSA 05301C50   RET 80FD2C38   EPA 8538C630   R0  03178AEC
               R1  0002F084   R2  0002EB84   R3  FFFFFFFF   R4  0002EB84   R5  0002A4D0   R6  00000000
               R7  00000001   R8  0002EB80   R9  00029740   R10 00000000   R11 00000000   R12 83178790
DGTFMD01 WAS ENTERED VIA CALL         AT EP DGTFMD05..90.349
SA   05301C50  WD1 00000000   HSA 0002EFD8   LSA 053018E0   RET 8538C832   EPA 8538DA38   R0  03178AEC
               R1  05301D70   R2  0000000C   R3  00000048   R4  05301F54   R5  05301E74   R6  00000000
               R7  00000000   R8  8002EB9A   R9  00029 740  R10 0539213C   R11 05301C50   R12 8538C630
UNKNOWN  WAS ENTERED VIA CALL         AT EP ISPDIR.912 17
SA   00030AC0  WD1 000004C0   HSA 00030300   LSA 0003C010   RET 831708A6   EPA 8316ABC8   R0  00000000
               R1  00030B10   R2  00030E80   R3  000301B8   R4  000000FE   R5  00017C14   R6  00015218
               R7  00030668   R8  00030D60   R9  00029740   R10 00030DD8   R11 00000000   R12 83170018
UNKNOWN  WAS ENTERED VIA CALL         AT EP ISPDIL.92014.OY51175.3.3
SA   0003C010  WD1 000007C0   HSA 00030AC0   LSA 0003C7D0   RET 8316B89A   EPA 83178790   R0  05300FCC
               R1  0003C0E0   R2  00000000   R3  00000000   R4  00017000   R5  00017000   R6  00015218
               R7  0003C378   R8  0316DBC8   R9  00029740   R10 0316CBC8   R11 0316BBC8   R12 8316ABC8
DGTFVA00 WAS ENTERED VIA LINK
SA   0003C7D0  WD1 000000D0   HSA 0003C010   LSA 05301638   RET 80FD2C38   EPA 853AA7A0   R0  03178AEC
               R1  0003C87C   R2  0003C37C   R3  FFFFFFFF   R4  0003C37C   R5  0002A4D0   R6  00000000
               R7  00000001   R8  0003C378   R9  00029740   R10 00000000   R11 00000000   R12 83178790
DGTFVA00 WAS ENTERED VIA CALL         AT EP DGTFVA11..91.221
SA   053966F4  WD1 00000000   HSA 05301638   LSA 053B90BC   RET 853AB422   EPA 8539FCB0   R0  00000000
               R1  05396A20   R2  00000001   R3  00000000   R4  0003C37C   R5  0002A4D0   R6  00000000
               R7  00000001   R8  05396DB8   R9  053AC03D   R10 0539213C   R11 053966F4   R12 853AB03E
DGTFMD01 WAS ENTERED VIA CALL         AT EP DGTFCTPR..91.227
SA   053E80A4  WD1 00000000   HSA 053EA4E4   LSA 053E305C   RET 853FFB5A   EPA 0533F540   R0  053E83F4
               R1  053E827C   R2  053E8404   R3  0005BCD9   R4  053F3E80   R5  053EA874   R6  0005B832
               R7  0005A833   R8  053010CC   R9  053F3145   R10 0539213C   R11 053E80A4   R12 853FF476
```

Figure 15. ISMF—Finding the Module Name in a SYSUDUMP

1. Examine the `SAVE AREA TRACE` section of the SYSUDUMP.
2. Scan the left-hand margin, looking for the words `INTERRUPT AT`.
3. Look at each entry in the `SAVE AREA TRACE` section of the dump (scanning upward from the interrupt address) and find the `EPA` (entry point address) that is less than (but closest to) the interrupt address.
4. The name of the failing module is located in the row above its `EPA` (the one that you found in Step 3) in the center of the page. The module name should appear in one of the following two sets of words:

   ```
   WAS ENTERED VIA CALL    AT EP module name
   WAS ENTERED VIA LINK    AT EP module name
   ```

   In Figure 15, the module name for the failure is highlighted.
5. Specify the module name as the module keyword.

   Example: If the module name is DGTFTCMD, specify the module keyword as:

   ```
   DGTFTCMD
   ```
6. See “ISMF—Modifier Keywords” on page 77.

Chapter 13. Media Manager—Module Keyword

For abend, wait, or loop types-of-failure in the media manager, use the following procedure to build the module keyword.

Procedure

1. Locate in the dump obtained earlier the media manager process block (MMPB). The MMPB is near the beginning of the summary dump, and the acronym MMPB in EBCDIC representation is at offset 0 of the MMPB. See the sample media manager dump in the media manager diagnostic aids section of *z/OS DFSMSdfp Diagnosis Reference*.

   Use the 1-byte MMPMODID field at offset X'1C' in the MMPB to identify the media manager module in control when the failure occurred. The code values in the field are the same as the values in the `ff` field of the media manager return codes, listed in media manager return codes section of *z/OS DFSMSdfp Diagnosis Reference*.

   Example: If the MMPMODID field value is 05, specify the module keyword as:

   ```
   ICYCCHHR
   ```

2. See “Chapter 18. Modifier Keywords” on page 67.

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Chapter 14. OPEN/CLOSE/End-of-Volume (Common)—Module Keyword

Use this section to build the module keyword for common O/C/EOV.

Procedure

Use one of the following three procedures.

Abend Type-of-Failure

1. If the failure is indicated by an abend 001, the failure is in the SAM subcomponent. Change the component identification keyword to indicate the SAM subcomponent (see Table 22 on page 89) and see “Chapter 15. SAM—Module Keyword” on page 61 to build the module keyword.
2. If the system issued a message identifying an abend condition, and the module name appears in the message text, specify the module name keyword as shown in the fourth step below. If the name does not appear in the message, do the following:
   a. Using the formatted section of the dump, scan the RBs for the job in question, looking for the one representing the failing user program.
   b. The interrupt code field in the user’s RB should indicate an SVC code representing the call to the DFSMSdfp service that abended. The next RB represents the failing DFSMSdfp service. Its interrupt code field (IC portion of the WC-L-IC field) should match the abend code.
   c. Using the address portion of the PSW field in that RB, locate that address in the dump and scan toward either the lower or higher addresses, looking in the translated EBCDIC in the right-hand column for a module name. Common O/C/EOV modules contain the CSECT name in the copyright information at the start of each CSECT and in the XCTL table at the end of each CSECT. Typically, register 6 will point to the name of the current CSECT.

      You can also determine the load module name by matching the PSW instruction address with the addresses in an LPA map (all common O/C/EOV load modules and CSECTs reside in the LPA).
   d. Specify the entire load module or CSECT name as the module keyword.

      Example: If the name is IFG0194C, specify the module keyword as
      ```
      IFG0194C.
      ```
3. See “OPEN/CLOSE/End-of-Volume (Common)—Modifier Keywords” on page 82.

Wait/Loop Type-of-Failure

You should have obtained a system dump and determined the instruction address as directed earlier. If the problem is a loop, it might be necessary to obtain either a module-to-module trace, a GTF trace, or a SLIP trace. (See the OPEN/CLOSE/End-of-Volume (common) diagnostic aids section of *z/OS DFSMSdfp Diagnosis Reference* for details.)

1. Once you determine a failure-related module, specify it as the module keyword.

   Example: If the module name is IFG0194C, specify the keyword as:

   ```
   IFG0194C
   ```
2. See “OPEN/CLOSE/End-of-Volume (Common)—Modifier Keywords” on page 82.

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Message Type-of-Failure

1. If a system message contains a failure-related module name or significant modifier keyword information, record these items on the “Keyword Worksheet” on page 5.
2. See “OPEN/CLOSE/End-of-Volume (Common)—Modifier Keywords” on page 82.

Chapter 15. SAM—Module Keyword

Use this section to build the module keyword for the SAM subcomponent.

Procedure

If the failure is indicated by an ABEND001, use the following procedure to determine the module name. Otherwise, see Table 22 on page 89.

1. Using the formatted portion of the dump obtained earlier, scan the RBs for the job in question, looking for the one that issued an EOV SVC just prior to the abend. The INTCODE field of the RB contains X'0037' for jobs that issued an EOV SVC. Check the dump and locate the INTCODE field. Refer to *z/OS MVS Diagnosis: Tools and Service Aids* for information on dumps.
2. The instruction address in the RB's PSW is the failure-related address. Determine the module name by matching that address with the addresses in an LPA map. Most SAM modules reside in the LPA. (The exceptions are module IGG019V6 in SYS1.SVCLIB and SAM modules in SYS1.LINKLIB that support IBM 3505/3525 Reader/Punch.)
3. Use the entire module name as the module keyword.

   Example: If the module name is IGG019BB, specify the module name keyword as `IGG019BB.`

   If the system issued message IEC020I to inform the system operator of the abend, the message text identifies the O/C/EOV module that processes SAM abend 001s. Record the module name. If your keyword string does not produce any similar problems in the software support database, replace the SAM module name with the O/C/EOV module name that appears in the IEC020I message and perform the search again.
4. See "Chapter 18. Modifier Keywords" on page 67.

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Chapter 16. Catalog Management—Module Keyword

Use this section to build the module keyword for a catalog.

Procedure

1. To determine which module is related to the failure, scan backward in the dump. Using the failing PSW address from either the abend or the wait/loop keyword procedure as a starting point (see the EPSW in the dump or the R/TM work area summary), scan the translated EBCDIC output in the right-hand column for a module name. (In the sample formatted dump portion in Figure 16 it is IGG0CLAT.) Specify the entire module name as the module keyword.

```
000192A0 00 00000008 00015246 00070B9E 0001815A  000183CE 0001DE66 0001C13E 0004ED16  *.........................A.....*
000192C0 00 0003B8AA 00010A42 0001F3BE 0001FD36  000201EE 000230CE 0002D316 00038C2E  *.........3...............L.....*
000192E0 00 000458FE 0004A40A 0004A97E 00000000  000475CE 00038056 0001A14E 00057B8E  *.............................*
00019300 00 00053822 0005582A E2E8E2F1 48E5E5C4  E24BE5C7 C5D5C4E2 D7404000 00000000  *........SYS1.VVDS.VGENDSP  .....*
00019320 00 47F0F024 C9C7C7F0 C3D3C1E3 F0F861F3  F161F8F6 C8C4D7F3 F3F1F040 D5D6D5C5  *.00.IGG0CLAT08.31.84JDZ1110 NONE*
00019340 00 40404040 C9C7C7D7 C3C4E5D9 07FE90CE  D00C41DD 000C05C0 41A0CFFF 4190AFFF  *    IGGPCDVR...................*
00019360 00 50D0B12C D202B40D A5A64110 B13092FC  B13991A0 10080A04 181F1211 4780C040  *....K.........................*
00019380 00 D203B004 A5B958F0 A65D05EF 41A0CFFF  4190AFFF 47F0C052 9180B314 47E0C04C  *K......0.............0.........*
000193A0 00 45E0CDF6 D2F7B314 B31C9500 B0074780  C06292A4 B00D45E0 CD2E5850 B4105050  *...6K7.....................*
```

Figure 16. Catalog Management Sample SVC Dump—Module Name in EBCDIC Section

2. To obtain a map of the catalog load module, take either of the following actions:
   - Execute the LISTLOAD XREF option of AMBLIST for modules IGG0CLHA and IGG0CLX0.
   - Use the map of modules IGG0CLHA and IGG0CLX0 provided in all CAS SVC dumps. Figure 17 on page 64 shows part of such a map. For each CSECT in load modules IGG0CLHA and IGG0CLX0, the map includes the following information:
     – The starting address of the CSECT
     – The CSECT name
     – The CSECT FMID
     – The CSECT service level.
3. See “Catalog Management—Modifier Keywords” on page 86.

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```
CAS Module CSECT MAP&colon.

01AEA000   00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000  *................................*
01AEA020   TO NEXT LINE ADDRESS SAME AS ABOVE
01AEA980   C9C7C7D4 D6C4D4D7 00001680 01AEA9A0   01AEABC0 00000000 00000000 00000000  *IGGMODMP........................*
01AEA9A0   C9C7C7F0 C3D3C8C1 00CC4000 00CCEE48   00000010 00000000 00000000 00000000  *IGG0CLHA........................*
01AEA9C0   00CC4000 C9C7C7F0 C3D3C8C1 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *.. .IGG0CLHAJDZ1110 NONE    ....*
01AEA9E0   00CC6BB8 C9C7C7F0 C3D3C8C2 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLHBJDZ1110 NONE    ....*
00CCAA00   00CC5760 C9C7C7F0 C3D3C8C3 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLHCJDZ1110 NONE    ....*
01AEAA20   00CC74D8 C9C7C7F0 C3D3C8C4 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *...QIGG0CLHDJDZ1110 NONE    ....*
01AEAA40   00CC7A20 C9C7C7F0 C3D3C8C5 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLHEJDZ1110 NONE    ....*
01AEAA60   00CC7BF0 C9C7C7F0 C3D3C8C6 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *...0IGG0CLHFJDZ1110 NONE    ....*
01AEAA80   00CC8288 C9C7C7F0 C3D3C8E5 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLHVJDZ1110 NONE    ....*
01AEAAA0   00CC8428 C9C7C7F0 C3D3C8F0 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLH0JDZ1110 NONE    ....*
01AEAAC0   00CC8A60 C9C7C7F0 C3D3C8F1 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLH1JDZ1110 NONE    ....*
01AEAAE0   00CC9590 C9C7C7F0 C3D3C8F2 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLH2JDZ1110 NONE    ....*
01AEAB00   00CC9E70 C9C7C7F0 C3D3E7C1 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLXAJDZ1110 NONE    ....*
01AEAB20   00CCB2B8 C9C7C7F0 C3D3E7C2 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLXBJDZ1110 NONE    ....*
01AEAB40   00CCC898 C9C7C7F0 C3D3E7C3 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *..H.IGG0CLXCJDZ1110 NONE    ....*
01AEAB60   00CCD200 C9C7C7F0 C3D3E7C4 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *..K.IGG0CLXDJDZ1110 NONE    ....*
01AEAB80   00CCE180 C9C7C7F0 C3D3E7C5 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLXEJDZ1110 NONE    ....*
01AEABA0   00CCE7D8 C9C7C7F0 E3D9D4F1 C8C4D7F3   F3F1F040 61F0F461 40404040 00000000  *..XQIGG0TRM1JDZ1110 NONE    ....*
01AEABC0   C9C7C7F0 C3D3E7F0 000098C8 00081000   00000084 00000000 00000000 00000000  *IGG0CLX0...J....................*
01AEABE0   000098C8 C9C7C7F0 C3D3E7F0 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *...HIGG0CLX0JDZ1110 NONE    ....*
01AEAC00   0000AC30 C9C7C7F0 C3D3C6F0 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLF0JDZ1110 NONE    ....*
01AEAC20   0000BFE8 C9C7C7F0 C3D3C1C8 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *...YIGG0CLAHJDZ1110 NONE    ....*
01AEAC40   0000D628 C9C7C7F0 C3D3C1F3 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *..O.IGG0CLA3JDZ1110 NONE    ....*
01AEAC60   0000F5C0 C9C7C7F0 C3D3C6F5 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *..5.IGG0CLF5JDZ1110 NONE    ....*
01AEAC80   00010900 C9C7C7F0 C3D3C5C7 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLEGJDZ1110 NONE    ....*
01AEACA0   00011DB0 C9C7C7F0 C3D3C6F4 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLF4JDZ1110 NONE    ....*
01AEACC0   00012CD8 C9C7C7F0 C3D3C6F6 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *...QIGG0CLF6JDZ1110 NONE    ....*
01AEACE0   00014768 C9C7C7F0 C3D3C2F6 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLB6JDZ1110 NONE    ....*
01AEAD00   00015218 C9C7C7F0 C3D3C5C1 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLEAJDZ1110 NONE    ....*
01AEAD20   00017288 C9C7C7F0 C3D3C6E3 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLFTJDZ1110 NONE    ....*
01AEAD40   00018990 C9C7C7F0 C3D3C5C8 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLEHJDZ1110 NONE    ....*
01AEAD60   00019320 C9C7C7F0 C3D3C1E3 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLATJDZ1110 NONE    ....*
01AEAD80   0001AA00 C9C7C7F0 C3D3C6F1 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLF1JDZ1110 NONE    ....*
01AEADA0   0001B460 C9C7C7F0 C3D3C6F3 C8C4D7F3   F3F1F040 D5D6D5C5 40404040 00000000  *....IGG0CLF3JDZ1110 NONE    ....*
    .
    .
    .
```

Figure 17. Catalog Management—Sample CAS SVC Dump of CSECT Address Map

Chapter 17. Other DFSMSdfp Subcomponents—Module Keyword

Use this section to build the module keyword for DFSMSdfp subcomponents for which no unique procedure exists.

Procedure

Use one of the following procedures:

Abend Type-of-Failure Procedure

1. If the system issued a message identifying an abend condition, the module name might appear in the message text. The CSECT name or module name might also appear in the dump title in a console message or after executing the DISPLAY DUMP,TITLE system command.
2. If an EREP software record exists for the failure, use the failing PSW address with maps of the nucleus and LPA to determine the failing module, and then go to Step 3d. (See *EREP User's Guide* for details.)
3. If neither condition is true, continue as follows:
   a. Using the formatted section of the dump, scan the RBs for the job in question, looking for the one representing the failing user program.
   b. The interrupt code field in the user's RB should indicate an SVC code representing the call to the DFSMSdfp service that abended. The next RB represents the failing DFSMSdfp service. Its interrupt code field (IC portion of the WC-L-IC field) should match the abend code.
   c. Using the address portion of the PSW field in that RB, locate that address in the dump and scan toward the lower addresses, looking in the translated EBCDIC in the right-hand column for a module name. Most DFSMSdfp modules contain the module name at the start of each CSECT. You can also determine the module name by matching that address with the addresses in a map of the nucleus or LPA.
   d. Specify the entire module name as the module keyword.
4. See "Chapter 18. Modifier Keywords" on page 67.

Wait/Loop Type-of-Failure Procedure

You should have obtained a system dump and determined the instruction address as directed earlier. If the problem is a loop, it might be necessary to obtain a GTF trace.

1. Using the instruction address from the waiting or looping RB's OPSW field and the NUCMAP or LPAMAP (as directed in Step 5 on page 19), determine which module resides at that address, and specify the entire module name as the module keyword.
2. See "Chapter 18. Modifier Keywords" on page 67.

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Message Type-of-Failure Procedure

1. If the message text or format is incorrect, use the message-to-module table in *z/OS MVS System Messages, Vol 1 (ABA-AOM)*, through *z/OS MVS System Messages, Vol 10 (IXC-IZP)*, to identify the issuing module, and specify the module name as the module keyword.

   If the message was issued at the wrong time or under the wrong conditions, use the same table and specify the name of the detecting module as the module keyword.
2. See “Other DFSMSdfp Subcomponents—Modifier Keywords” on page 87.

Chapter 18. Modifier Keywords

Use this section to build the modifier keywords that can include function, subfunction, or other modifying information. The modifier keywords are optional but might be necessary to restrict the scope of a software database search to a reasonable number of matches. Use them to describe the unique characteristics of the failure.

You can often identify the failing function and subfunction when you determine the type-of-failure. You might be able to identify a failure-related general register or control block (invalid data, same value every time the failure occurs, and so forth). You should be able to identify the probable failing component from a failure-related indication (message, unique abend code, and so forth).

Procedure

1. Examine the “Standard Modifier Keyword List” on page 68 to see if any modifier keywords describe an aspect of the failure. Record any such keywords on the “Keyword Worksheet” on page 5.
2. For incorrect output or performance types-of-failure, the system might not provide enough information to identify a failure-related module. If, however, you can identify a failure-related function or other modifier, specify them as the modifier keyword(s). See Table 22 on page 89.
3. For all other types-of-failure, select the procedure for the failure-related component from Table 8.

Table 8. Procedure for the Failure-Related Component

Subcomponent	Procedure
Catalog Management	See “Catalog Management—Modifier Keywords” on page 86.
DADSM/CVAF	See “DADSM/CVAF—Modifier Keywords” on page 71.
DASD Common Services	See “DASD Common Services—Modifier Keywords” on page 76.
ISMF	See “ISMF—Modifier Keywords” on page 77.
Media Manager	See “Media Manager—Modifier Keywords” on page 78.
OAM	See “Object Access Method —Modifier Keywords” on page 82.
OPEN/CLOSE/End-of-Volume (Common)	See “OPEN/CLOSE/End-of-Volume (Common)—Modifier Keywords” on page 82.
SMS	See “Storage Management Subsystem—Modifier Keywords” on page 83.
All other DFSMSdfp subcomponents	See “Other DFSMSdfp Subcomponents—Modifier Keywords” on page 87.

4. If SYS1.LOGREC contains a failure-related hardware record, identify the status and hardware device type using the following list of modifier keywords.

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Standard Modifier Keyword List

Table 9 lists modifier keywords that demonstrates the standards you must follow when specifying them. Keywords preceded by an asterisk (*) indicate invalid keywords. The invalid keyword description provides the correct keyword.

Table 9. Standards for Modifier Keywords

Keyword	Meaning
ABEND	Use for a system abend in a context that does not relate to a specific code
ABEND*nnn*	Use ABEND*nnn* for a system abend (for example, ABEND0C1, ABEND0F4)
ABENDU*nnnn*	Use ABENDU*nnnn* for a user abend (for example ABENDU0845)
*Access method services	Use IDCAMS
*APAR *nnnnn*	Use OY*nnnnn* (for example, OY12345)
*CA split	Use CI/CA SPLIT
CC*xx*	Condition code (exactly as the system presents it)
CHAN	Channel
*CI split	Use CI/CA SPLIT
CI/CA SPLIT	Control interval and/or control area split
*Catalog Management	Use CATMGT
CATMGT	Catalog management function of VSAM
*Checkpoint/Restart	Use CHKPT
CHKPT	Checkpoint/Restart
CMD REJ	Command reject (hardware sense bit)
*Command reject	Use CMD REJ
*Condition code	Use CC*xx* (exactly as the system presents it)
*Control block	Use the standard control block identifier, for example, DCB, AMB, RPL, and so forth
COREOVERLAY	Main storage overlay or overlaid
CPC	Channel program check (hardware sense bit)
CREG*nn*	Control register
*Cross-Memory mode	Use XMM
DCK	Data check (hardware sense bit)
*Data Language/I function of IMS	DL/I
*Device Type *nnnn*	Use D/T*nnnn* (for example, D/T3380)
DI*nnnnnnnn*	DADSM diagnostic information (*nnnnnnnn* is four hex bytes)
D/T*nnnn*	Device type related to problem, if only one device type experiences the failure
*Duplicate Records	Use DUPREC
DUPREC	Failure causes duplicate records in a data set
EQC	Equipment check (hardware sense bit)
ESDS	Entry sequenced data set

Table 9. Standards for Modifier Keywords (continued)

Keyword	Meaning
*Format-*n* DSCB	Use F*n*DSCB
F*n*DSCB	Type of DSCB (*n* is a decimal digit, for example F4DSCB)
*High-Impact Pervasive problems	Use HIPER
ICC	Interface control check (hardware sense bit)
IDCAMS	Access method services
Incorrect output, unrelated to performance degradation	Use INCORROUT
INDEX	Data set index (used when describing data set damage)
*Instruction	Use INST/*xxx*
INST/*xxx*	Failing instruction mnemonic (for example, INST/MVCL)
Initial Program Load of the system	Use IPL
KSDS	Key sequenced data set
*Label *xxxxxx*	Use LBL*xxxxxx* (for example, LBLNAME01). **Note:** For PLS-generated labels, omit the @.
LBL*xxxxxx*	Program listing statement label *xxxxxx*
LDS	Linear data set
*Lost records	Use MISSREC
*Manuals	Do not use hyphens (for example, GC264149)
*Master catalog	Use MASTCAT or MCAT
MASTCAT	Master catalog (MCAT is also permissible)
MCAT	Master catalog (MASTCAT is also permissible)
*Missing records	Use MISSREC
MISSREC	Missing records from a data set
*Model number (hardware device)	Use D/T with a three-digit model number (D/T3380 023)
NCA	Not capable (tape hardware sense bit)
*No record found	Use NRF
NRF	No record found in data set
*OPEN/CLOSE/EOV	Use O/C/EOV
O/C/EOV	OPEN/CLOSE/End-of-Volume (common) subcomponent of DFSMSdfp
*Out of sequence	Use OUTOFSEQ
OUTOFSEQ	Record keys out of sequence
OVR	Overrun (hardware sense bit)
PROGCK*xx*	Hardware program check (for example, PROGCK01, PROGCK0C)
*Hardware program check	Use PROGCK
*PTF *nnnnn*	Use UY*nnnnn* (for example, UY12345)

Modifier Keywords

Table 9. Standards for Modifier Keywords (continued)

Keyword	Meaning
*Publications	Do not use hyphens (for example, GC264149)
*Return Code, decimal value	Use RC*nn* (exactly as the system presents it, for example RC04, RC12)
RC*nnn*	Return code, reason code, function code, error code, and so forth (exactly as the system presents it)
*Reason code, hex value	RS*xxxxxxxx* (for example, RS0418003C) Use RSN*xxxxxxxx* for PDSE
*Record Management	Use RECMGT
RECMGT	Record management function of VSAM
*Record Management Trace	Use RMTRACE
*Record-Level Sharing	Use RLS (or VSAMRLS)
*Registers	Use REG*nn* for general purpose registers, CREG*nn* for control registers, and FPREG*nn* for floating point registers (*nn* is either one or two decimal digits with leading zeros.)
REG*nn*	General purpose register (use two decimal digits, for example, REG02 or REG14)
*Release Level	Use R*nnn*
Record-Level Sharing	
RMTRACE	Record management trace facility of VSAM
RPLFDBWD*nnnnnnnn*	RPL feedback-word (*nnnnnnnn* is four hexadecimal bytes)
RRDS	Relative record data set
*Share options	Use SHROPT
SHROPT	VSAM share options
SKC	Seek check (DASD hardware sense bit)
*Storage Overlay	Use COREOVERLAY
*Supervisor Call	Use SVC*nn* or 0A*nn*
SVC*nn*	Supervisor call Instruction (*nn* is decimal, no leading zeros, or use 0A*nn* (*nn* is hexadecimal)
UCAT	User catalog (USERCAT is also permissible)
UCK	Unit check (hardware sense bit)
UEX	Unit exception (hardware sense bit)
USERCAT	User catalog (UCAT is also permissible)
*User catalog	Use UCAT or USERCAT
*Volume table of contents	Use VTOC
VTOC	DASD volume table of contents
*Catalog	Use VSAMCAT
VSAMCAT	Catalog
*Master catalog	Use MASTCAT or MCAT

Table 9. Standards for Modifier Keywords (continued)

Keyword	Meaning
*VSAM Record-Level Sharing	Use VSAMRLS (or RLS)
VSAMRLS	VSAM Record-Level Sharing
WAIT	Task or job waiting for an event
WAIT*xxx*	System disabled wait with hex code of 'xxx' (for example, WAIT04F)
WRI	Write inhibit switch should be checked (DASD hardware sense bit)
*Wrong record	Use WROREC
WROREC	Wrong record in data set
0A*nn*	Supervisor call instruction (*nn* is hexadecimal)

DADSM/CVAF—Modifier Keywords

Use this section to build the modifier keywords (function and subfunction) for DADSM and CVAF. The modifier keywords are optional but might be necessary to restrict the scope of a software database search to a reasonable number of matches. Use them to identify a specific problem area.

Common Procedure

For a description of the conditions associated with nonzero return codes and status codes related to failures in the DADSM functions, see the DADSM/CVAF diagnostic aids section of *z/OS DFSMSdfp Diagnosis Reference*. Some DADSM functions can return 4 bytes of diagnostic information (in the accompanying IEC614I message), which you should specify as modifier keywords. This diagnostic information consists of the DADSM error code, the subfunction identifier, the subfunction return code, and the subfunction reason code.

1. The DADSM return code is provided in register 15. Sometimes, it is provided in register 13 for extended data sets. Specify the return code exactly as the system provides it.

   Example: If the return code is 04, specify the modifier keyword as RC04.

2. The 4 bytes of diagnostic information are provided in register 0. See the DADSM return codes section of *z/OS DFSMSdfp Diagnosis Reference* for further information. If the diagnostic information bytes are relevant to your failure, specify them as a single modifier keyword in the following order:
   - DADSM error code
   - Subfunction identifier
   - Subfunction return code
   - Subfunction reason code

   Example: If the 4 bytes are 08170486, specify the modifier keyword as `RSN08170486.`

3. Continue below with the applicable procedure.

Abend Failure Modifier Keywords Procedure

Two function tables exist—one for DADSM functions (see Table 10), and one for CVAF functions (see Table 11 on page 73).

- If the failure occurred in a DADSM function, use the DADSM function table; if it occurred in a CVAF function, use the CVAF function table.
- Record the function and/or subfunction as modifier keywords on the "Keyword Worksheet" on page 5.

  Example: If the function is ALLOC and the subfunction is INIT, specify the modifier keywords as shown.

  ```
  ALLOC INIT
  ```

- See Table 22 on page 89.

Table 10. DADSM Functions

Function	Subfunction	Description
COMMON		Miscellaneous internal DADSM functions
CREATE (ALLOCATE)	INIT	Initializes space allocation and routes requests to the appropriate subfunction
	NONIALL	Allocates space for everything except ISAM data sets
	IALL	Allocates space for ISAM data sets
	CONV	Converts a DOS VTOC, or an OS indexed VTOC whose VTOC index has been disabled, to the standard nonindexed OS VTOC format, enabling OS VTOC DADSM routines to be used
EXTEND		Allocates secondary space for data sets
LSPACE		Calculates available space on a direct access volume and optionally writes SMF record 19
OBTAIN		Reads DSCBs from the VTOC
PRLSE		Frees unused space
PROTECT		Maintains the system password data set
RENAME		Renames data sets
SCRATCH		Deletes a data set or VSAM data space
VRF		Recovers from interruptions in DADSM for indexed VTOCs

Table 11. CVAF Functions

Function	Subfunction	Description
CM		Initializes CVAF processing and provides services to other CVAF functions
DM		Uses the maps in the VTOC index to manage space on a direct access device
DS		Reads and writes DSCBs and VTOC index records
FI		Reads sets of DSCBs for one or more data sets specified by a qualifier list
GT		Prompts the system operator through WTOR for: • Unit addresses for which GTF tracing of CVAF events is to be started or stopped. • CVAF debug/trap options.
IX	ADD	Adds an index entry to an indexed VTOC
	DEL	Deletes an index entry from an indexed VTOC
	SRCH	Retrieves a specified entry in a VTOC index entry record
LS		Responds to a volume demount system event and invalidates the VTOC information block
SM		Notifies SMS of space usage changes on a system-managed volume
TS		Tests for the presence of CVAF on the system and for an indexed VTOC on a specific volume
VO		Initializes the VTOC information block
VR		Records and retrieves VTOC recovery data in the VTOC index

Incorrect Output Failure Modifier Keywords Procedure

You might find it difficult to determine either the function orthe module that caused the problem. One DADSM or CVAF function might modify and write the VTOC or VTOC index record, that causes a problem some other unrelated function detects later. Or, you might detect the problem in a listing of the VTOC or VTOC index.

1. Use the CVAF generalized trace facility (GTF) trace as described in *z/OS DFSMSdfp Diagnosis Reference* to trace the CVAF events.
   a. Examine the GTF trace records to determine the events leading to the failure.

      The event identification ID is located at offset 14 (X'0E') in the trace record. CVAF event IDs and the corresponding events and functions are as follows.

Event ID	Event	Function
0FAF	Write DSCB	DS
0FB0	Write VTOC index record (VIR)	DS
0FB1	Add index	IX
0FB2	Delete index	IX
0FB3	Allocate space	DM
0FB4	Release space	DM
0FB5	Allocate VTOC index space	DM
0FB6	Release VTOC index space	DM
0FB7	Allocate VTOC space	DM
0FB8	Release VTOC space	DM

   b. You can usually identify the function that caused the incorrect output by determining the macro that was issued. If it was a DADSM macro, the failing subcomponent is DADSM; go to Step 1d. If it was a CVAF macro, the failing subcomponent is CVAF; go to Step 1e. If you cannot determine whether the failing subcomponent is DADSM or CVAF, obtain the component identifiers for both subcomponents in Table 22 on page 89. Record them for use in the software database search procedure. Build two keyword strings, one with each component identifier.
   c. See Table 22 on page 89.
   d. See Table 10 on page 72 to determine the failing DADSM function. Code the keyword(s) exactly as they are shown in the table.

      The DADSM function modifier keywords are merely abbreviations of the related DADSM functions. The SCRATCH, RENAME, OBTAIN, PARTREL, and PROTECT macros are DADSM macros and they invoke DADSM functions. SVCs exist for each of these macros, as well as for ALLOC and LSPACE. System internal calls invoke the DADSM extend and partial release functions so you must identify these functions from failure-related events.

      See Table 22 on page 89.
   e. See Table 11 on page 73 to determine the failing CVAF function; code the keyword(s) exactly as they are shown in the table. All CVAF macros except CVAFTST are associated with a CVPL. For those macros, go to Step 1j on page 75. For CVAFTST, continue with the next step.

f. If the CVAFTST macro returned an invalid return code, specify TS as the modifier keyword.

g. If the CVAF GTF trace data is invalid, specify GT as the modifier keyword.

h. If a volume demounted by the system did not cause CVAF to rebuild the VIB, either the CVAF LS function or the function that issued the demount (OPEN, EOV, VSAM OPEN, Scheduler) failed. Specify the modifier keyword accordingly.

   Note: Demount is not a DADSM/CVAF function.

i. See Table 22 on page 89.

j. Locate the CVPL, which is in the DADSM work area. Use the eye catcher by scanning the readable portion of the DADSM work area. The CVFCTN field (offset 6 in the CVPL) contains a 1-byte CVAF function code.

k. Identify the CVAF function keyword corresponding to the value in the CVAF function byte and specify it as the modifier keyword. The possible values of the CVAF function byte and the corresponding function keywords are shown in Table 12.

Table 12. CVAF Function Byte Values in the CVPL

Value of CVAF Function Byte	Function Keyword	Subfunction Keyword
01 (X'01')	DS	—
02 (X'02')	DS	—
03 (X'03')	DS	—
04 (X'04')	DS	—
05 (X'05')	DS	—
06 (X'06')	IX	ADD
07 (X'07')	IX	DEL
08 (X'08')	DM	—
09 (X'09')	DM	—
10 (X'0A')	DM	—
11 (X'0B')	VO	—
12 (X'0C')	VR	—
13 (X'0D')	VR	—
14 (X'0E')	FI	—
15 (X'0F')	FI	—
16 (X'10')	FI	—

See Table 11 on page 73 for a detailed description of the operations performed by the CVAF functions.

l. A previous VTOC or index update might have caused the present problem. Use IEHLIST to obtain a listing of the contents of the VTOC and the VTOC index. To list the index, specify INDEXDSN=SYS1.VTOCIX.V*nnnnnn*, in which *nnnnnn* is the name of your VTOC index.

m. See Table 22 on page 89.

Message Failure Modifier Keywords Procedure

1. Using the module name determined in “Chapter 10. DADSM/CVAF—Module Keyword” on page 49, locate that module name in either the DADSM module-to-function cross-reference section or the CVAF module-to-function cross-reference section of *z/OS DFSMSdfp Diagnosis Reference* to determine any applicable modifier (function and subfunction) keywords.

   Example: If the module name is IGG0325B, specify the modifier keywords as shown:

   ```
   ALLOC NONIALL
   ```

2. See Table 22 on page 89.

DASD Common Services—Modifier Keywords

Use this section to build the modifier keywords for DASD common services. The modifier keywords are optional but might be necessary to restrict the scope of a software database search to a reasonable number of matches. Use them to identify a specific problem area.

Procedure

Use the following fields in the problem determination area (PDA) as modifier keywords except for common filter services, which neither employ an ESTAE nor use a PDA:

- Failure-related module
- Most recent calling function
- Return code
- Reason code.

The failure-related ISPF log entry’s FEEDBACK field contains the PDA information. See the first entry in the sample ISPF log in the ISMF diagnostic aids section of *z/OS DFSMSdfp Diagnosis Reference* for a sample entry containing PDA information. See the section on DASD common services—problem determination area (PDA) in *z/OS DFSMSdfp Diagnosis Reference* for a description of the PDA contents.

1. Specify the contents of the PDA fields as modifier keywords.

   Example: If the module name is IGBDIS01, the return code is 10, and the reason code is 038, specify the modifier keywords as:

   ```
   IGBDIS01 RC10 RC038
   ```

2. See Table 22 on page 89.

ISMF—Modifier Keywords

Use this section to build the modifier keywords for ISMF. The modifier keywords are optional but might be necessary to restrict the scope of a software database search to a reasonable number of matches. Use them to identify a specific problem area.

Procedure

ISMF uses an entry in the ISPF log data set to record information that can help in diagnosing a problem. See the section on ISMF's use of the ISPF log in *z/OS DFSMSdfp Diagnosis Reference* for a description of the ISPF log and ISMF logging options.

ISMF also provides the ERTB command, which displays failure symptoms that you can specify as search keywords. See the section on using the logging/abend control entry panel and the section on using the ERTB display panel in the ISMF diagnostic aids portion of *z/OS DFSMSdfp Diagnosis Reference* for details.

1. You can use the contents of the following ISPF log entry fields as modifier keywords:
   Application identifier
   Function identifier
   Module name
   Procedure identifier
   Last panel identifier
   Service
   Feedback
   Return code
   Reason code
2. If you can relate a log entry to the error, use Table 13 to determine which log information to specify as modifier keywords.
   - For abend failures, specify the module you determined in "Chapter 12. ISMF—Module Keyword" on page 53 as the module name keyword.
   - For message-indicated failures, specify the return code and reason code you determined in "ISMF—Message Keyword" on page 26 as modifier keywords. (Specify them exactly as the system presented them.)

Table 13. ISMF—Information Needed to Build the Modifier Keywords

Type-of-Failure	Modifier
Abend	Application identifier Function identifier Last panel
Message	Application identifier Function identifier Module identifier Procedure Last panel Service Feedback Return code Reason code
Incorrect Output	Application identifier Function identifier Return code Reason code Last panel
Wait/Loop	Application identifier Function identifier Return code Reason code Last Panel
Performance	Application identifier Function identifier Return code Reason code Last panel Service Feedback

3. If you cannot relate an ISPF log entry to the failure (incorrectoutput, wait, or loop types-of-failure), use Table 14 to determine which modifier keywords to specify.

Table 14. ISMF—Modifier Keywords to Use When the Log Is Not Available

Failing Function	Keyword
Primary Option Menu	MAIN DLG
Profile	PROFILE
Application selection	SELECT
Initializing an application	INIT
Displaying a list	DISPLIST
Line operators	Line operator name
Commands	Command name
Exiting ISMF	TERM

4. Continue with “Adding Modifiers to the Keyword String”.

Adding Modifiers to the Keyword String

1. Specify (in any order) the appropriate modifiers as keywords.

   The sample log entry in Figure 18 illustrates a message-indicated failure.After specifying MSGDGTDS004 as the type-of-failure keyword, specify the values listed after the applicable labels (as identified in Table 13 on page 77). The application modifier keyword is DATA SET.

```
*****  ISMF ERROR  ***** - APPLICATION(DGT1 - DATA SET); FUNCTION(SELECT)
                         - RETURN CODE(0008); REASON CODE(0006)
                         - MODULE(DGTFDS03); PROCEDURE(GENAARAY)
                         - MESSAGE ID(DGTDS004 - DGTDS004); LAST PANEL(DGTDDDS1)
                         - SERVICE(DGTFDS04); FEEDBACK(NONE)
```

Figure 18. ISMF—Sample ISMF Entry in ISPF Log

2. To add modifier keywords to the keyword string, use only the significant log entry field values as keywords, ignoring any fields containing duplicate values. For example, specify the keyword string for the log entry sample in Figure 18 as follows:

   ```
   MSGDGTDS004 DATA SET SELECT RC8 RC6 DGTFDS03 GENAARAY DGTDDDS1 DGTFDS04
   ```

3. See Table 22 on page 89.

Media Manager—Modifier Keywords

Use this section to build the modifier keyword (function) for the media manager. The modifier keywords are optional but might be necessary to restrict the scope of a software database search to a reasonable number of matches. Use them to identify a specific problem area.

Two procedures follow. The first is for abend, wait, or loop types-of-failure. The second is for identifying a probable failing function if the first procedure does not, or if the failure is other than an abend, wait, or loop.

Abend/Wait/Loop Modifier Keyword Procedure

To determine the failing media manager function, use the following procedure to locate the calling program and identify the type of call.

1. Use the dump obtained earlier for either the abend or wait/loop type-of-failure.
2. Register 13 at the time of the abend points to the save area of the media manager's caller. Standard save area conventions are followed. Linkage to media manager is via registers 14 and 15. Parameters are passed in registers 0, 1, and 2. In DFSMS, media manager uses the BAKR instruction, and the registers are saved on the linkage stack. The registers are not saved in the standard storage area. It is possible to format the linkage stack with IPCS.
3. Locate in the dump the save area pointed to by register 13. Locate register 14 in the save area; it points to the calling program's next sequential instruction following the instruction that called media manager.
4. Locate in the dump the instruction in the calling program that passed control to media manager. The instruction is similar to the one shown:

```
Machine         Assembler
Language        Language
Instruction     Instruction     Usage

440E044A        EX 0,1098(14)   (Common for all linkages)
```

5. Trace backward from that instruction, looking for the following sequence of linkage instructions:

```
Machine         Assembler
Language        Language
Instruction     Instruction

58E00010        L 14,16(0)
58F0E148        L 15,328(,14)
58F0F010        L 15,16(,15)
```

6. One of the instructions shown in Table 15 follows this sequence of instructions. It identifies the media manager function invoked by the caller.

Table 15. Identifying the Media Manager Function Invoked

Machine Language Instruction	Assembler Language Instruction	Modifier (Function) keyword
58F0F008	L 15,8(,15)	INIT
58F0F00C	L 15,12(,15)	RDWR
58F0F010	L 15,16(,15)	FMTWR
58F0F014	L 15,20(,15)	PFMT
58F0F018	L 15,24(,15)	CNVT (RBA TO CCHHR)
58F0F01C	L 15,28(,15)	CNVT (CCHHR TO RBA)
58F0F020	L 15,32(,15)	SRV
58F0F028	L 15,40(,15)	COMMIT, DISCARD
58F0F030	L 15,48(,15)	WRITE
58F0F034	L 15,52(,15)	PIO
58F0F038	L 15,56(,15)	PIOPG
58F0F03C	L 15,60(,15)	PIOC

Tip: Because I/O and program processing are asynchronous, the most recent program activity might not involve a media manager call. However, by looking for these linkage instructions, you can locate the most recent media manager calls to the INIT, CNVT, or SRV functions.

7. Specify the media manager function as the modifier keyword.

   Example: If the function is CNVT, specify the keyword as CNVT.
8. If the function is neither INIT, CNVT, nor SRV, continue with this process. Otherwise, see Table 22 on page 89.
9. The function must be either RDWR, FMTWR, or PFMT. Continue with this procedure.
10. If functional recovery routines are in effect and a program check or abend occurs either in the media manager or in an exit routine from the media manager, the system automatically directs a summary dump of media manager control blocks to the SYS1.DUMPxx data set.

    When printing a dump from a SYS1.DUMPxx data set, print at least the summary dump portion of the dump, using the IPCS dump formatter (see *z/OS MVS IPCS User's Guide* for details on using this service). If ICYFRR issued the SDUMP, use the sample media manager dump in the media manager diagnostic aids section of *z/OS DFSMSdfp Diagnosis Reference* for the following steps:
11. Locate in the dump the media manager process block (MMPB). It is near the beginning of the summary dump, and the acronym MMPB in EBCDIC representation appears at offset 0 in the MMPB itself.

    If you cannot locate the media manager process block this way, use the following procedure:

    a. Locate the MMVT via the CVTMMVT field in the CVT and look for the first storage vector MMSV via the eye catcher ICYMMSV1. See the sample media manager dump in the media manager diagnostic aids section of *z/OS DFSMSdfp Diagnosis Reference* .

    b. Each two-word MMSV entry following the eye catcher consists of a lockword (unused or caller's ASID) followed by a pointer to the media manager storage block containing the MMPB(s). Multiple MMPBs exist, some of which are active and some inactive; to find the one that might be related to the failure, examine the MMPASID and MMPBPARM fields for the ASID and input parameters, respectively.
12. The MMPFLG2 field in the MMPB is a 1-byte field that identifies which media manager function was in control.

MMPFLG2 Value	Modifier (Function) Keyword
X'08'	PFMT
X'10'	FMTWR

Example: If the function is PFMT, specify the modifier keyword as PFMT.

If neither value is present, the function, by default, is RDWR.

13. See Table 22 on page 89.

Alternate Modifier Keyword Procedure

Use this procedure if the previous procedure has not isolated the failing media manager function, or if the type-of-failure is other than abend, wait, or loop.

Function keywords divide the media manager into logical areas. A unique acronym identifies each of these functions.

1. From the following list, select the modifier (function) keyword that describes the area you suspect of failure.

Function	Description
CNVT	Converts relative byte addresses to absolute device addresses (CCHHR), and vice versa. The CNVT function uses modules ICYCCHHR and ICYRBA.
FMTWR	Processes requests to format and write tracks sequentially. The FMTWR function uses modules ICYABN, ICYABN, ICYBLDCP, ICYBLIST, ICYDIE, ICYFW, ICYNRM, ICYPGAD, ICYRBA, and ICYSTOR.
INIT	Initializes the media manager control blocks. The INIT function uses modules ICYIEDB, ICYILPMB, and ICYINIT.
MMSYSTEM	Manages media manager resources. The MMSYSTEM function uses modules ICYELE, ICYFRR, and ICYPURG.
PFMT	Processes requests to preformat tracks within a range of relative byte addresses. The PFMT function uses modules ICYCCHHR, ICYPFCP, ICYPFMT, ICYRBA, ICYSTOR, ICYPFDIE, and ICYPFAPP.
RDWR	Processes requests to read or write the data portion of records. The RDWR function uses modules ICYABN, ICYBLDCP, ICYBLIST, ICYDIE, ICYNRM, ICYPGAD, ICYRBA, ICYRDWR, ICYSORT, and ICYSTOR.
SRV	Set of functions that interface with a catalog to obtain data set information and to update that information when explicitly requested. The SRV function uses modules ICYMMSRV and ICYMSTAE.

2. Specify the modifier keyword as FMTWR.
3. See Table 22 on page 89.

Object Access Method —Modifier Keywords

The following common modifier keywords are used to diagnose specific problem areas of OAM subcomponents.

Function	Description
OVTOC	Optical volume table of contents
RC*nn.*	Return code
RSN*nn*	Reason code
XRC*nn*	External return code
XRSN*nnnnnnnn*	External reason code
STORCLASS	Storage class
MGTCLASS	Management class
STORGROUP	Storage group
OAM	Object access method
OSMC	Object access method storage management component
OTIS	Object access method thread isolation support
OSR	Object storage and retrieval
LCS	Library control system
3495	IBM TotalStorage Enterprise Automated Tape Library (3495)
3995	IBM 3995 Optical Library Dataserver
9246	IBM 9246 RPQ Optical Storage Subsystem Product
9247	IBM 9247 RPQ Optical Storage Subsystem Product
MO	Magneto-optic (erasable optical media)
WORM	Write once read many (nonerasable optical media)

OPEN/CLOSE/End-of-Volume (Common)—Modifier Keywords

Use this section to build the modifier keywords for common OPEN/CLOSE/End-of-Volume functions. The modifier keywords are optional but might be necessary to restrict the scope of a software database search to a reasonable number of matches. Use them to identify a specific problem area.

Procedure

1. Except for the first load modules of common OPEN/CLOSE/End-of-Volume functions (listed below), the first 3 characters of most module names are IFG, and the fourth through sixth characters of the module name identify the function. Select a function from Table 16 on page 83.

Table 16. List of Entry Points

Module Name	Function Keyword
IFG019	OPEN
IFG020	CLOSE
IFG023	TCLOSE
IFG055	EOV
IFG0RR	RECOVERY
IFG0TC	TERMINATION
IGC0001I	OPEN
IGC00020	CLOSE
ICG0002C	TCLOSE
IGC0005E	EOV
IGC0002B	OPENJ
IGC0003A	FEOV (force end-of-volume)
IGC0006D	RDJFCB (read JFCB)
IGC0010C	XLATE (translate to and from ASCII (BSAM and QSAM))

Example: If the function is OPEN, specify the modifier keyword as OPEN.

2. See Table 22 on page 89.

Partitioned Data Set Extended—Modifier Keywords

Use this section to build the modifier keywords for Partitioned Data Set Extended data sets when you have received ABEND0F4 dumps or LOGREC records. The ABEND0F4 dump title or LOGREC record will provide the failing CSECT name. A return code and reason code should always be associated with the module name when building keywords for an ABEND0F4.

Procedure

1. If a LOGREC record is available for an ABEND0F4, locate the registers at the time of abend in the LOGREC record. Specify the contents of register 15 as the return code, and the contents of register 0 as the reason code.
2. If an SVC dump is available for an ABEND0F4, locate the return code and reason code that appear in the dump title.

Storage Management Subsystem—Modifier Keywords

Use this section to build the modifier keywords for the Storage Management Subsystem. The modifier keywords are optional but might be necessary to restrict the scope of a software database search to a reasonable number of matches. Use them to identify a specific problem area.

If SMS issues either message IGD300I or IGD306I, use the SUMDUMP or SYS1.LOGREC information respectively to identify failure-related modifier keywords.

Procedure

1. Specify modifier keywords based on the failure-related SMS function or process. Use Table 17 to identify any applicable keywords. Record them on the “Keyword Worksheet” on page 5 as modifier keywords.

Table 17. SMS General Keywords

Keyword	Failure-Related Command
ACDS	N/A
ACS	N/A
AVGREC	N/A
COMMDS	N/A
DATACLAS	N/A
DEVSERVSMS	Operator command 'DEVSERV SMS'
DISPLAYSMS	Operator command 'DISPLAY SMS'
DO	N/A
DSNTYPE	N/A
END	N/A
EXIT	N/A
FILENUM	N/A
IART	N/A
IF	N/A
KEYLEN	N/A
KEYOFF	N/A
LABEL	N/A
LIBNAME	N/A
LIKE	N/A
MGMTCLAS	N/A
PGM	N/A
PROC	N/A
REFDD	N/A
SCDS	N/A
SECMODEL	N/A
SETSMS	Operator command 'SETSMS'
SETSMSEQ	Operator command 'SET SMS='
SMSDATA	IPCS verbexit 'SMSDATA'
STORCLAS	N/A
STORGRP	N/A
VARY	Operator command 'VARY' (not 'VARY SMS')
VARYSMS	Operator command 'VARY SMS'

For problems involving ACS routine execution, specify as keywords any applicable variables and statements from Table 18. For example, if the variable is ACSENVIR, specify ACSENVIR as the modifier keyword.

Table 18. ACS Variable and Statement Keywords

ACCT_JOB	DSTYPE	NVOL
ACCT_STEP	EXPDT	RECORG
ACSENVIR	FILTLIST	RETPD
ALLVOL	GROUP	SELECT
ANYVOL	HLQ	SET
APPLIC	JOB	SIZE
DD	LLQ	SYSNAME
DEF_DATACLAS	MAXSIZE	SYSPLEX
DEF_MGMTCLAS	MEMHLQ	UNIT
DEF_STORCLAS	MEMLLQ	USER
DSN	MEMN	WRITE
DSNTYPE	MEMNQUAL	XMODE
DSORG	MSVGP	
DSOWNER	NQUAL	

For problems related to serialization of SMS resources, specify the applicable resource names as shown in Table 19.

Access to a PDSE is serialized with an enqueue that uses SYSZIGW0 and SYSZIGW1.

GRS can be used to propagate the enqueue names as global resources. This insures PDSE integrity across multiple systems. For more information, see “Sharing Access to a PDSE” in z/OS DFSMS Migration

Example:. If the major resource name is SYSZIGDI and the minor resource name is SMS VECTOR TABLE, specify the keywords as:

```
SYSZIGDI SMS VECTOR TABLE
```

Table 19. Resource Name Keywords

Major Name	Minor Name
IGDCDS	N/A
IGDCDSXS	N/A
SYSZIGDI	ICMRT CMDSADDR LOCKED
SYSZIGDI	IGDSSI00
SYSZIGDI	IGDSSI01
SYSZIGDI	SMS VECTOR TABLE
SYSZIGW0	N/A
SYSZIGW1	N/A

2. See Table 22 on page 89.

Catalog Management—Modifier Keywords

Use this section to build the modifier keywords for the failure-related catalog management subcomponent. The modifier keywords are optional but might be necessary to restrict the scope of a software database search to a reasonable number of matches. Use them to isolate a specific problem area. The keywords identify the following problems:

- Failure-related access method services commands
- Internal catalog management functions

The catalog management subcomponents follow:

- Catalog
- Access method services

Procedure

1. From Table 20, select the keywords that describe the type of catalog in use at the time of failure. (More than one could be applicable.)

Table 20. List of Failure-Related Catalog Types

ICFCAT
MASTCAT (or MCAT)
USERCAT (or UCAT)
VSAMCAT

2. From the modifier keyword list in Table 21, select the keyword that identifies the area in which you suspect the failure occurred.

Table 21. List of Failure-Related Access Method Services Commands

ALLOCATE	DELETE
ALTER	DIAGNOSE
BINDDATA	EXAMINE
BLDINDEX	EXPORT
CNVTCAT	EXPORTRA
DEFINE ALIAS	IMPORT
DEFINE ALTERNATE INDEX	IMPORTRA
DEFINE CLUSTER	LISTCAT
DEFINE GDG	LISTCRA
DEFINE MASTERCATALOG	LISTDATA
DEFINE NONVSAM	PRINT
DEFINE PAGESPACE	REPRO
DEFINE PATH	RESETCAT
DEFINE SPACE	SETCACHE
DEFINE USERCATALOG	VERIFY

   Example: If the failure occurred while you were executing the DEFINE USERCATALOG command, specify the modifier keywords as :

   ```
   DEFINE USERCATALOG
   ```

3. See Table 22 on page 89.

Other DFSMSdfp Subcomponents—Modifier Keywords

Use this section to build the modifier keywords for DFSMSdfp subcomponents for which no unique procedure exists. The modifier keywords are optional but might be necessary to restrict the scope of a software database search to a reasonable number of matches. Use them to identify a specific problem area. They could identify a function, command name, register name, register contents, and so forth.

Procedure

1. Scan the list of standard modifier keywords in “Chapter 18. Modifier Keywords” on page 67 and specify any that apply to the failure.
2. Specify the function, command name, or other modifier as it is spelled in a message, manual, or other identifying material.
3. See Table 22 on page 89.

Chapter 19. Component Identification Keyword

Use this section to identify the suspected failing DFSMSdfp component in your keyword string.

1. Table 22 lists the component identification keyword for each DFSMS component. Specify the entire nine-digit component identification shown in the table as the keyword.
2. See “Chapter 20. Release Level Keyword” on page 93.

Table 22. Component Identification Keywords

Component Name	Component Identification Keyword	Subcomponents
DFSMS Installation	5695DF100	DFSMSdfp INSTALL
Storage Management Subsystem	5695DF101	Storage Management Subsystem
Base Access Methods	5695DF102	SAM
		DAM
		PAM
		Common Adapters
		VIO
		SAM Subsystem Interface
		3505/25 Reader/Punch
		ISAM
		IEBISAM
Access Method Services	5695DF103	Access Method Services (IDCAMS)
DFSMS Common Services	5695DF104	Common Measurement Manager
		DASD Common Services
Catalog	5695DF105	Catalog
VSAM/Media Manager	5695DF106	Media Manager
		VSAM Block Processor
		VSAM O/C/EOV
		VSAM Record Management
Data Management Support	5695DF107	DADSM
		Password Protect
		CVAF
		OPEN/CLOSE/End-of-Volume
Program Management	5695DF108	Linkage Editor
		LINK/LOADGO Prompter
		Loader
		AMBLIST
		Overlay Supervisor
		PROGRAM FETCH
		IGWSPZAP
		Program Management Binder
		Program Management Loader
Checkpoint Restart	5695DF109	Checkpoint Restart
Device Support: Tape/Unit Record	5695DF110	Tape ERP
		Unit Record ERP
		MSGDISP (Message Description Macros)
		TAPE/Unit Record Device Description Table)
		SIO Exits— Tape
		IEHINITT
		IFHSTATR

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Component Identification Keyword

Table 22. Component Identification Keywords (continued)

Component Name	Component Identification Keyword	Subcomponents
Device Support: DASD	5695DF111	DASD ERP
		DASD Device Description Tables
		SIO EXITS— DASD
		ATLAS SVC
Device Support Services	5695DF113	Device Console Services (DEVSERV Paths)
		Asynchronous Operations Manager (AOM)
		Cache Device Services
Utilities	5695DF114	IEHLIST
		IEHPROGM
		IEHMOVE
		IEBIMAGE
		IEBUPDTE
		IEBEDIT
		3800 OFFLINE Utility
		IEBPTPCH
		IEBGENER
		TSO/E Utilities
		IEBDG
		IEBCOMPR
		IEBCOPY
Extended Data Services (PDSE)	5695DF115	Buffer Management Facility (BMF)
		Common Data Manager (CDM)
		Common Lock Manager (CLM)
		Index Management Facility (IMF)
		System Services Facility (SSF)
		File Attributes Manager (FAMS)
Volume Mount Analyzer	5695DF116	Volume Mount Analyzer (VMA)
		SMF extract utility (GFTAXTR)
		Volume Mount Analyzer (GFTAVWA)
System Data Mover	5695DF117	Concurrent Copy Manager
Compression Management Services	5695DF118	Compression Management Services (CMP)
VSAM Record-Level Sharing	5695DF122	Buffer Management Facility - Local Cache (BLC)
		Common Error Recovery Services (CERS)
		Measure Management Facilities (MMF)
		Service Queue Manager (SQM)
		Shared Hierarchy Management (SHM)
		Shared Latch Services (SLCH)
		Sharing Control (SHC)
		Storage Management Locking Services (SMLS)
		Storage Management Protocol Manager (SMPM)
		VSAM RLS OPEN/CLOSE/End-of-Volume (VOC)
		VSAM RLS Quiesce (VQUI)
		VSAM RLS Record Management (VRM)
		VSAM RLS Server Services (VSS)

Table 22. Component Identification Keywords (continued)

Component Name	Component Identification Keyword	Subcomponents
NaviQuest	5695DF123	None
ISMF and HCD	5695DF161	Hardware Configuration Dialog ISMF ISMF English Panels ISMF Japanese Panels
OAM	5695DF180	Object Storage and Retrieval (OSR) OAM Storage Management Component (OSMC) Library Control System (LCS)

Component Identification Keyword

Chapter 20. Release Level Keyword

Using the release level keyword when searching the software database is optional. However, the release level keyword is required for an APAR.

Including the release level keyword in your keyword string will limit the software database search to problems reported against that release.

Tip: While this might reduce the number of matches against your keyword string, it could inadvertently eliminate the software record you hoped to find. The problem might have been reported against a different release. Use “Techniques for Varying the Search Argument” on page 4 to avoid this.

Use the following procedure to determine the release level keyword for the failure-related DFSMSdfp module on your system.

Procedure

Use one of the following methods to obtain the DFSMSdfp FMID. Refer to Table 23 on page 94 to find the corresponding release level keyword.

- Method A—Using SMP/E (requires knowing the module name)
- Method B—Using the Module Copyright Area (requires knowing the module name and having a dump containing the module)

If you cannot determine the module name, bypass this procedure and see “Searching with the Keyword String” on page 2.

Method A—Using SMP/E

If you suspect a specific module of causing the problem, you can use this procedure to determine the FMID of DFSMSdfp.

1. List the consolidated software inventory (CSI), using the following SMP/E control statements:

   ```
   SET BDY (tgtzone).
   LIST MOD (name) XREF.
   ```

   Be sure to include the period at the end of the control statements.
2. In the NAME column of the CSI, locate the name of the module causing the problem.
3. In the entry for the module, find the FMID field.
4. Find the corresponding release level keyword in Table 23 on page 94.
5. See “Chapter 21. Service Level Keyword” on page 95.

Related reading: For more details on using this procedure, see *SMP/E Reference*.

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Method B—Using the Module Copyright Area

1. Locate the module in the dump by scanning the EBCDIC portion in the address range associated with the failure-related module. The first part of the module contains the following:
   - Copyright statement
   - Module name
   - FMID
   - Service level (PTF number or APAR number) of the module.
2. In the copyright area, find the FMID field.
3. Find the corresponding release level keyword in Table 23.
4. See “Chapter 21. Service Level Keyword” on page 95.

Table 23. FMIDs and Corresponding Release Level Keywords

FMID	Release Level Keyword
HDP3330	R330
JDP3331	R331
JDP3332	R332
JDZ1110	R110
HDZ11B0	R1B0
HDZ11C0	R1C0
HDZ11D0	R1D0

Chapter 21. Service Level Keyword

Use this procedure to determine the service level of a DFSMSdfpmodule installed on your system. The service level of a module is defined as the most current fix applied to that module. It might be any one (but only one) of the following:

- The highest level APAR fix applied to a module.
- The highest level PTF fix applied to a module.
- The FMID of the DFSMSdfp product to which a module belongs (if no fixes have been applied to the module).

The service level keyword is optional in the keyword string, but is required when communicating with the IBM Support Center.

Use this keyword to identify any recently applied software service (APARs or PTFs) that seems to be failure-related.

Procedure

Use one of the following methods to obtain the service level of a DFSMSdfp module:

- Method A—Using SMP/E
- Method B—Using the Module Copyright Area
- Method C—Using the SDUMP Title Page.

The service level is normally adjacent to the module name in a dump.

Method A—Using SMP/E

1. List the appropriate target zone of the CSI. The control statements are:

   ```
   SET BDY (tgtzone).
   LIST MOD (name) XREF.
   ```

   in which `tgtzone` is the target zone and `name` is the module name.
2. Using the output listing, locate the name of the failure-related module in the NAME column of the CSI.
3. In the entry for that module, locate the replacement module identifier (RMID) field. The RMID field contains one of the following:
   - An APAR number
   - A PTF number
   - The FMID of the DFSMSdfp product of which the module is a part (if no fixes have been applied to the module).

   Tip: You can also determine a module's service level by using the SMP/E query dialog. For more information, see *SMP/E Reference*.
4. To determine whether a specific PTF is installed on your system without knowing what modules it affects, use your installation's SMP procedure as follows:
   a. Using SMP/E, list the SYSMODs; the control statement is:

      ```
      SET BDY (tgtzone).
      LIST SYSMOD (ptf#).
      ```

      Related reading: For more details on using this procedure, see *SMP/E Reference*.

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Service Level Keyword

5. Specify the service level keyword.

   Example: If the service level of the failure related module is UY12345, specify UY12345 as the service level keyword.
6. See “Searching with the Keyword String” on page 2.

Method B—Using the Module Copyright Area

1. Locate the service level in the copyright information at the beginning of the failure-related CSECT.
2. Specify the service level keyword.

   Example: If the service level of the failure related module is UY12345, specify the service level keyword as UY12345.
3. See “Searching with the Keyword String” on page 2.

Method C—Using the SDUMP Title Page

1. Locate the service level in the SDUMP header title.
2. Specify the service level keyword.

   Example: If the service level of the failure related module is UY12345, specify the service level keyword as UY12345.
3. See “Searching with the Keyword String” on page 2.

Chapter 22. Contacting the IBM Support Center for Assistance

Contact the IBM Support Center for assistance in gathering additional documentation. Be prepared to supply the following information:

- The keyword string (or strings) that you have built
- Customer number
- Current release level for MVS/ESA™, SP™, and DFSMSdfp or z/OS.
- Processor number (type, model, serial)
- Your program update tape level (PUT tape), which is a collection of PTFs and APARs, and any additional APARs and PTFs applied to this release
- An SMP/E listing of installed service available

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Appendix. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen-readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

Using assistive technologies

Assistive technology products, such as screen-readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Volume I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

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Glossary

This glossary defines technical terms and abbreviations used in DFSMS documentation. If you do not find the term you are looking for, refer to the index of the appropriate DFSMS manual or view the *IBM Dictionary of Computing Terms* located at:

http://www.ibm.com/networking/nsg/nsgmain.htm

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- The *IBM Dictionary of Computing*, New York: McGraw-Hill, 1994.

The following cross-reference is used in this glossary:

See: This refers the reader to (a) a related term, (b) a term that is the expanded form of an abbreviation or acronym, or (c) a synonym or more preferred term.

A

ABEND. Abnormal end.

ABP. Actual block processor (either the IOM module IDA121A2 or the IOM communication vector table).

ACB. See *Access method control block.*

access method control block (ACB). A control block that links an application program to VSAM or VTAM® programs.

access method services. A multifunction service program that manages VSAM and nonVSAM data sets, as well as integrated catalog facility (ICF). Access method services provides the following functions:

- defines and allocates space for data sets and catalogs
- converts indexed-sequential data sets to key-sequenced data sets
- modifies data set attributes in the catalog
- reorganizes data sets
- facilitates data portability among operating systems
- creates backup copies of data sets
- assists in making inaccessible data sets accessible
- lists the records of data sets and catalogs
- defines and builds alternate indexes
- converts CVOLS and VSAM catalogs to ICF catalogs

ACDS (SMS). See *Active control data set.*

ACDS (SMP). Alternate control data set (a data set used by SMP).

ACS. Automatic class selection.

ACS installation exit. User-written code, run after an ACS routine, that provides capabilities beyond the scope of the ACS routine.

ACS routine. A procedural set of ACS language statements. Based on a set of input variables, the ACS language statements generate the name of a predefined SMS class, or a list of names of predefined storage groups, for a data set.

ACS specification statement. One of the source statements of an ACS routine.

active configuration. The most recently activated source control data set (SCDS), which now controls storage management for the SMS complex.

active control data set (ACDS). A VSAM linear data set that contains an SCDS that has been activated to control the storage management policy for the installation. When activating an SCDS, you determine which ACDS will hold the active configuration (if you have defined more than one ACDS). The ACDS is shared by each system that is using the same SMS configuration to manage storage. See also *source control data set, communications data set*.

actual extent. An area in the DEB containing data that describes the space occupied by an extent of a data

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set. BDAM module IGG0193A builds one actual extent for each extent in the data set.

ADATA. Associated data.

adcon. Address constant.

ADDR. Addressed processing.

aggregate backup. The process of copying an aggregate group and recovery instructions so that a collection of data sets can be recovered later as a group.

aggregate group. A collection of related data sets and control information that have been pooled to meet a defined backup or recovery strategy.

AL. American National Standard Labels.

alias. An alternative name for an entry or for a member of a partitioned data set (PDS).

alias entry. An entry that relates an alias to the real entry name of a user catalog or non-VSAM data set.

allocation. Generically, the entire process of obtaining a volume and unit of external storage, and setting aside space on that storage for a data set.

AMBL. Access method block list.

AMBXN. Access method block extension.

AMDSB. Access method data statistics block.

AMODE. Addressing mode.

AOM. See *Asynchronous Operations Manager.*

APAR. See *Authorized Program Analysis Report.*

APF. Authorized program facility.

ARDB. Address range definition block.

ASCB. Address space control block.

ASI. Asynchronous interrupt.

Asynchronous Operations Manager (AOM). A subcomponent of DFSMSdfp that is a ″control″ interface to the IBM 3990 subsystem.

Authorized Program Analysis Report (APAR). A record in the Software Support Facility that documents problems with IBM software products.

automated tape library data server. A device consisting of robotic components, cartridge storage areas, tape subsystems, and controlling hardware and software, together with the set of tape volumes that reside in the library and can be mounted on the library tape drives. Contrast with *manual tape library*. See also *tape library*.

automatic call library mechanism. The process in which the linkage editor or loader processes control sections to resolve external references to members of partitioned data sets not resolved by primary input processing.

automatic class selection (ACS) routine. A procedural set of ACS language statements. Based on a set of input variables, the ACS language statements generate the name of a predefined SMS class, or a list of names of predefined storage groups, for a data set.

automatic data set protection (ADSP). In z/OS, a user attribute that causes all permanent data sets created by the user to be automatically defined to RACF with a discrete RACF profile.

automatic dump. In DFSMShsm, the process of using DFSMSdss automatically to do a full-volume dump of all allocated space on a primary storage volume to designated tape dump volumes.

AUTOTBL. Storage table (access method services).

availability. For a storage subsystem, the degree to which a data set or object can be accessed when requested by a user.

AVT. Appendage vector table.

B

backup. The process of creating a copy of a data set or object to be used in case of accidental loss.

backup data set. A copy that can be used to replace or reconstruct a damaged data set.

base configuration. The part of an SMS configuration that contains general storage management attributes, such as the default management class, default unit, and default device geometry. It also identifies the systems or system groups that an SMS configuration manages.

base configuration information. The base information for a configuration that includes default device geometry, default unit, system names for the complex, SMS resource status token, default management class, and data set status.

basic catalog structure (BCS). The name of the catalog structure in the integrated catalog facility environment. See also *integrated catalog facility catalog*.

BCDIC. Binary coded decimal interchange code.

BCS. Basic catalog structure.

BDAM. See *Basic direct access method.*

BDW. Block descriptor word.

BIB. Base information block.

binder. The DFSMS program that processes the output of language translators and compilers into an executable program (load module or program object). It replaces the linkage editor and batch loader in z/OS.

blkref field. A field the user specifies in a program that contains either the relative or the actual address of the record to which the user wants access. If it is the relative address, the BDAM address conversion routines convert it to an actual address (MBBCCHHR). The actual address is then placed in the IOBSEEK field of the IOB so that the channel program can use the address to find a block. The address of the blkref field is in the block address operand of the READ or WRITE macro.

block position feedback. A user-specified option that causes the system to put the actual or relative address of the block just read or written into the area specified in the block address operand of the READ or WRITE macro. The format of the address will be MBBCCHHR if feedback was not specified in the DCB macro; otherwise, the format will be the same as the addressing scheme in the DCB macro.

block unused. For non-VSAM data sets, block unused represents the amount of space (returned in kilobytes) that would be saved if the optimal block size were used instead of the current block size. For VSAM data sets, block unused represents the amount of space (returned in kilobytes) that would be saved if the optimal CI (control interval) size were used instead of the current CI size.

BLPRM. Resource pool parameter list.

BMF. Buffer management facility.

bpi. Bits per inch.

BPI. Bytes per inch.

BSPH. Buffer subpool header.

BUFC. Buffer control block.

BWD. Backward (processing).

C

C. Close.

CA. Control area.

cache set. A parameter on storage class and defined in the base configuration information that maps a logical name to a set of CF cache structure names.

candidate volume. A direct-access storage volume that has been defined in a catalog as a VSAM volume; VSAM can then automatically allocate space on this volume, as needed.

capacity record. The first block (block 0) on each track of a data set. It contains the ID of the last block on the track and the number of usable bytes remaining on the track.

CAS. See *Catalog address space.*

catalog. A data set that contains extensive information required to locate other data sets, to allocate and deallocate storage space, to verify the access authority of a program or operator, and to accumulate data set usage statistics. See *master catalog* and *user catalog*.

catalog address space (CAS). A separate address space in virtual storage that contains catalog management modules and control blocks.

catalog cleanup. A process that allows the deletion of entries if their volume is no longer available; catalog cleanup also allows deletion of a catalog even though it is not empty. Catalog cleanup is a function of the DELETE command.

catalog connector. A catalog entry, called either a user catalog entry or a catalog connector entry, in the master catalog that points to a user catalog's volume (that is, it contains the volume serial number of the direct-access volume that contains the user catalog).

CATX. Option to open a catalog without SVC 26.

CAXWA. Catalog auxiliary work area.

CBIC. See *Control blocks in common.*

CBUF. Control block update facility.

CCA. Catalog communication area.

CCB. CVAF common block.

CCHHR. Cylinder/head record address.

CCR. (1) Catalog control record. (2) Channel command retry.

CCW. Channel command word.

CCX. Catalog communication area extension.

CDE. Contents directory element.

CDS. See *Control data set.*

CDM. Common data manager.

CFS. Common filter service.

Character Data Representation Architecture (CDRA) API. A set of identifiers, services, supporting resources, and conventions for consistent representation, processing, and interchange of character data.

CHKPT. Checkpoint.

CHR. Checkpoint header record.

CI. Control interval.

CICB (Catalog management). Catalog integrity control block.

CICB (SAM). JES coexistence interface control block.

CICB (SAM). JES coexistence interface control block.

CIFWA. CAS interface work area.

CIPT. Control interval pointer table.

CISA. Catalog integrity save area.

CIST. Control interval substitution table.

CKDS. Cryptographic key data set.

class transition. An event that brings about change to an object's service-level criteria, causing OAM to invoke ACS routines to assign a new storage class or management class to the object.

CLW. Close work area (VSAM - mapped by IDACLWRK).

CLWA. Close work area (common OPEN/CLOSE/End-of-Volume).

CNV. Control interval or control-interval processing.

COMMDS. See *Communications data set.*

common VTOC access facility (CVAF). A DFSMSdfp subcomponent used to retrieve information from indexed and nonindexed VTOCs.

communications data set (COMMDS). The primary means of communication among systems governed by a single SMS configuration. The COMMDS is a VSAM linear data set that contains the name of the ACDS and current utilization statistics for each system-managed volume, which helps balance space among systems running SMS. See also *active control data set* and *source control data set*.

complex. See SMS complex.

compress. (1) (1) To reduce the amount of storage required for a given data set by having the system replace identical words or phrases with a shorter token associated with the word or phrase. (2) (2) To reclaim the unused and unavailable space in a partitioned data set that results from deleting or modifying members by moving all unused space to the end of the data set.

concurrent copy. A function to increase the accessibility of data by enabling you to make a consistent backup or copy of data concurrent with the usual application program processing.

construct. One of the following: data class, storage class, management class, storage group, aggregate group, base configuration.

control blocks in common (CBIC). A facility that enables the user to open a VSAM data set so that the VSAM control blocks are placed in the common service area (CSA) of the z/OS operating system. This provides the capability for multiple memory accesses to a single VSAM control structure for the same VSAM data set.

control data set (CDS). With respect to SMS, a VSAM linear data set that contains configuration, operations, or communications information. SMS introduces three types of control data sets: the source control data set, the active control data set, and the communications data set.

CONVERTED. A physical volume status indicating that all of the data sets on a volume have an associated storage class and are cataloged in a catalog. SMS can select a CONVERTED volume for all supported functions. See INITIAL.

CPA. Channel program area.

CPL. Catalog parameter list.

C/R. Checkpoint/restart.

cross memory. A synchronous method of communication between address spaces.

CRT. CAS resource table.

CSA. Common service area.

CSECT. Control section.

CSI. Consolidated software inventory (a data set used by SMP/E).

CSL. Core save list.

CSW. Channel status word.

CTC. Channel to channel.

CTGFL. Catalog field parameter list.

CTGFV. Catalog field vector table.

CTGPL. Catalog parameter list.

CTGVL. Catalog volume list.

CTGWA. Catalog work area.

CVAF. See *Common VTOC access facility.*

CVOL. Control volume.

CVOL catalog. The collection of all data set indexes maintained by CVOL catalog management.

CVPL. CVAF parameter list.

CVT. Communication vector table.

D

DADSM. Direct access device space management.

DASD. Direct access storage device.

DASD calculation services (DCS). A subcomponent of DFSMSdfp common services. DCS retrieves and calculates data set information for both VSAM and non-VSAM data sets based on the user's input request.

DASD volume. A DASD space identified by a common label and accessed by a set of related addresses. See also *volume, primary storage, migration level 1, migration level 2*.

DAT. Dynamic address translation.

data class. A collection of allocation and space attributes, defined by the storage administrator, that are used to create a data set.

data collection application. An ISMF application that enables the storage administrator to submit AMS DCOLLECT background jobs interactively or to save JCL for later use.

Data Facility Sort. An IBM licensed program that is a high-speed data processing utility. DFSORT provides an efficient and flexible way to handle sorting, merging, and copying operations, as well as providing versatile data manipulation at the record, field, and bit level.

dataplex. A set of systems in a multisystem environment that share system-managed data on system-managed storage devices.

data set. In DFSMS, the major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access. In z/OS non-UNIX environments, the terms *data set* and *file* are generally equivalent and sometimes are used interchangeably. See also *file*. In z/OS UNIX environments, the terms *data set* and *file* have quite distinct meanings.

data set collection. A group of data sets which are intended to be allocated on the same tape volume or set of tape volumes as a result of data set stacking.

data set pointer entry (DSPE). A CVOL catalog entry that identifies the volume on which a named data set resides.

data set stacking. The function used to place several data sets on the same tape volume or set of tape volumes. It increases the efficiency of tape media usage and reduces the overall number of tape volumes needed by allocation. It also allows an installation to group related data sets together on a minimum number of tape volumes, which is useful when sending data offsite.

DB2I. DB2 Interactive

DCBD. Data control block dummy section.

DCE. Device class extension.

DCME. Dynamic Cache Management Enhanced.

DCS. See *DASD calculation services.*

DD. Data definition.

DDNT. Ddname table.

DECB. Data event control block.

default device geometry. Part of the SMS base configuration, it identifies the number of bytes per track and the number of tracks per cylinder for converting space requests made in tracks or cylinders into bytes, when no unit name has been specified.

default management class. Part of the SMS base configuration, it identifies the management class that should be used for system-managed data sets that do not have a management class assigned.

default unit. Part of the SMS base configuration, it identifies an esoteric (such as SYSDA) or generic (such as 3390) device name. If a user omits the UNIT parameter on the JCL or the dynamic allocation equivalent, SMS applies the default unit if the data set has a disposition of MOD or NEW and is *not* system-managed.

DEQ. An Assembler language macro instruction used to remove control of one or more serially reusable resources from the active task (dequeue). It can also be used to determine whether control of the resource is currently assigned to, or requested for the active task.

DES. Data Encryption Standard.

device category. A storage device classification used by SMS. The device categories are as follows SMS-managed DASD, SMS-managed tape, non-SMS-managed DASD non-SMS-managed tape.

device information services (DIS). A subcomponent of DFSMSdfp common services. DIS enables a user to obtain information related to the unit control blocks (UCBs) for devices that are attached to the system.

device management. The task of defining input and output devices to the operating system, and then controlling the operation of these devices.

Device Support Facilities (ICKDSF). A program used for initialization of DASD volumes and track recovery.

DFSMSdfp. A DFSMS functional component or base element of z/OS, that provides functions for storage management, data management, program management, device management, and distributed data access.

DFSMSdss. A DFSMS functional component or base element of z/OS, used to copy, move, dump, and restore data sets and volumes.

DFSMShsm. A DFSMS functional component or base element of z/OS, used for backing up and recovering data, and managing space on volumes in the storage hierarchy.

DFSMShsm-managed volume. (1) (1) A primary storage volume, which is defined to DFSMShsm but which does not belong to a storage group. (2) (2) A volume in a storage group, which is using DFSMShsm automatic dump, migration, or backup services. Contrast with *system-managed volume, DFSMSrmm-managed volume*.

DFSMS. See *Data Facility Storage Management Subsystem.*

DFSMS Network File System. See *z/OS Network File System*.

DFSMSrmm. A DFSMS functional component or base element of z/OS, that manages removable media.

DFSMSrmm-managed volume. A tape volume that is defined to DFSMSrmm. Contrast with *system-managed volume, DFSMShsm-managed volume*.

dialog variable. Named variable that is defined to ISPF and used for communication between dialog functions, programs, command procedures, panels, messages, tables, and files.

dictionary. A table that associates words, phrases, or data patterns to shorter tokens. The tokens replace the associated words, phrases, or data patterns when a data set is compressed.

DIE. Disabled interrupt exit.

DIR. Direct processing.

direct access device space management (DADSM). A DFSMSdfp subcomponent used to control space allocation and deallocation on DASD.

DIRF. DADSM interrupt recording facility.

DIS. See *Device information services.*

disable all (DISALL). Relationship that prevents a system from allocating or accessing data sets in a VIO storage group, a pool storage group, or individual volumes within a pool storage group.

disable new (DISNEW). Relationship that prevents a system from allocating new data sets in a VIO storage group, a pool storage group, or individual volumes within a pool storage group.

DIV. Data in virtual.

DIWA. Data insert work area.

DOC APAR. An authorized program analysis report produced for a documentation problem.

DSAB. Data set association block.

DSDR. Data set descriptor record.

DSL. Data extent block save list.

DSORG. Data set organization.

DSPE. See *Data set pointer entry.*

DTT. Define tracking table.

dummy record. A record, created when BSAM builds a BDAM data set containing format F records, whose purpose is to provide space in which new records can be added to the data set after it is created. The first byte in the key field of the dummy record contains X'FF', and the first byte in the data field has a value indicating the position of the dummy record on the track (the R in MBBCCHHR).

dummy storage group. A type of storage group that contains the serial numbers of volumes no longer connected to a system. Dummy storage groups allow existing JCL to function without having to be changed. See also *storage group*.

dump class. A set of characteristics that describes how volume dumps are managed by DFSMShsm.

DVCT. Device characteristics table.

dynamic cache management. A function that automatically determines which data sets will be cached based on the 3990 subsystem load, the characteristics of the data set, and the performance requirements defined by the storage administrator.

E

EBCDIC. Extended binary coded decimal interchange code.

ECKD™. Extended count-key data.

ECSA. Extended common service area.

EDB. Extent definition block.

EDT. Eligible device table.

ELPA. See *Extended link pack area.*

enable. Relationship that allows a system to allocate and access data sets in a VIO storage group, a pool storage group, or individual volumes within a pool storage group.

ENDREQ. End the request.

ENF. Event notification facility.

ENQ. An Assembler language macro instruction that asks the control program to assign control of one or more serially reusable resources to the active task (enqueue). ENQ is also used to determine the status of a resource; that is, whether it is immediately available or in use, and whether control has been previously requested for the active task in another ENQ macro instruction.

EOKR. End-of-key range.

EOM. End-of-module or end-of-memory.

EOV. End of volume.

EP. External procedure entry point.

E/P. Entry point.

EPA. Entry point address.

EPCB. EXCP purge control block.

EPLPA. See *Extended pageable link pack area.*

EREP. Environmental error record editing and printing program.

ERFLG. Error flags.

ESDID. External symbol dictionary identification.

ESDS. Entry-sequenced data set.

ESL. Enqueue save list.

esoteric name. A name used to define a group of devices having similar hardware characteristics, such as TAPE or SYSDA.

esoteric unit name. A name used to define a group of devices having similar hardware characteristics, such as TAPE or SYSDA. Contrast with *generic unit name*.

ESQA. Extended system queue area.

ESTAE. (1) Extended specify task abnormal exit. (2) Extended subtask ABEND exit.

EUNLD. Unload parameter list.

EXCD. Exceptional conditions.

exclusive control. Preventing multiple WRITE-add requests from updating the same dummy record or writing over the same available space on a track. When specified by the user, exclusive control requests that the system prevent the data block about to be read from being modified by other requests; it is specified in a READ macro and released in a WRITE or RELEX macro. When a WRITE-add request is about to be processed, the system automatically gets exclusive control of either the data set or the track.

exclusive control list. An area of storage containing the UCB address and actual address of resources under exclusive control, and the addresses of the first and last IOBs for requests waiting to get exclusive control of that resource.

EXLST. Exit list.

export. To create a backup or portable copy of a VSAM cluster, alternate index, or catalog.

extended addressability. The ability to create and access a VSAM data set that is greater than 4 GB in size. Extended addressability data sets must be allocated with DSNTYPE=EXT and EXTENDED ADDRESSABILITY=Y.

extended format. The format of a data set that has a data set name type (DSNTYPE) of EXTENDED. The data set is structured logically the same as a data set that is not in extended format but the physical format is different. Data sets in extended format can be striped or compressed. Data in an extended format VSAM KSDS can be compressed. See also *striped data set, compressed format*.

extended link pack area (ELPA). The extension of the link pack area that resides above 16 megabytes in virtual storage.

extended pageable link pack area (EPLPA). The extension of the pageable link pack area that resides above 16 megabytes in virtual storage. See also *pageable link pack area*.

extended search. A user-specified option that requests that the system search for the specified block or a place in which to add a new block. The search is to start with the first block on the track which contains the block address operand specified in the request macro. The search continues either for as many tracks or blocks (rounded up to a complete track) as are specified in the request macro, or until the search ends successfully. Extended search is only applicable if relative addressing is being used.

F

F. Fixed (used to describe record format).

FBQE. Free block queue element.

FCB. Forms control buffer.

FCL. Filter criteria list.

FDT. Function data table (access method services).

file. A collection of information treated as a unit. In a z/OS environment that is not OpenEdition®, the terms *data set* and *file* are generally equivalent and are sometimes used interchangeably. See also *data set*.

filter list (FILTLIST). An inclusion/exclusion pair of lists that define filter criteria. FILTLISTs simplify comparison operations in ACS routines.

FILTLIST. Filter list.

FIPS. Federal Information Processing Standard.

FKS. Full key search.

FLIH. First level interrupt handler.

FLPA. Fixed link pack area.

FMID. See *Function modification identifier.*

FOE. Fixed ownership element.

format channel program. A channel program that writes a new record to an already existing data set. See also preformat channel program and self-format channel program.

FPL. Catalog field parameter list.

FQE. Free queue element.

free control interval pointer list. In a sequence-set index record, a vertical pointer that gives the location of a free control interval in the control area governed by the record.

FREEMAIN. An Assembler language macro instruction that releases one area of main storage that had previously been allocated to the job step as a result of a GETMAIN macro instruction.

free space. Space reserved within the control intervals of a key-sequenced data set for inserting new records into the data set in key sequence or for lengthening records already there; also, whole control intervals reserved in a control area for the same purpose.

FRR. Function recovery routines.

FS. Free space.

FSR. Function support routine (access method services).

function modification identifier (FMID). A code that identifies the release level of a DFSMS subcomponent.

FVT. Catalog field vector table.

FWD. Forward (processing).

G

GAT. Generation aging table.

GC. Type code (group code).

GCR. Group coded recording.

GDGNT. Generation data group name table.

GDS. Generation data set.

GDT. Global data table (access method services).

GEN. Generic key search.

generation data group base entry. An entry that permits a non-VSAM data set to be associated with other non-VSAM data sets as generation data sets.

generation index. An index of the CVOL catalog that identifies the generations of a generation data group.

generation index pointer entry (GIPE). A CVOL catalog entry that identifies a generation index.

generic unit name. A name assigned to a class of devices with the same geometry (such as 3390). Contrast with *esoteric unit name*.

GETMAIN. An assembler language macro instruction that is used to allocate an area of main storage for use by the job step task.

gigabyte. 1,073,741,824 bytes.

GIPE. See *Generation index pointer entry.*

GOFF. Generalized Object File Format.

group. (1) (1) With respect to partitioned data sets, a member and the member's aliases that exist in a PDS or PDSE, or in an unloaded PDSE. (2) (2) A collection of users who can share access authorities for protected resources.

GRS. Global resource serialization.

GTF. Generalized trace facility.

guaranteed space. A storage class attribute indicating that SMS is to honor user-specified VOL=SER= specifications, and that SMS is to fail the request if space is not available on the specified volumes. This attribute also preallocates space on all volumes specified by the user.

H

HA. Home address.

HCD. Hardware configuration dialog

header entry. In a parameter list of GENCB, MODCB, SHOWCB, or TESTCB, the entry that identifies the type of request and control block and gives other general information about the request.

HEB. Header element block.

HFS. See *Hierarchical File System.*

hierarchical file system (HFS) data set. A data set that contains a POSIX-compliant file system, which is a collection of files and directories organized in a hierarchical structure, that can be accessed using z/OS UNIX System Services. See also *file system.*

high-level name. The first component of a qualified name. This name is found in a volume index of the CVOL catalog.

horizontal extension. An extension record pointed to by a catalog record's extension field. See also vertical extension.

I

ICE. See *Index control entry.*

ICIP. Improved control-interval processing.

ICKDSF. Device Support Facilities.

ICWA. Index create work area.

IDAL. Indirect data-address list (real page list).

IDAX. SMS interpreter/dynamic allocation exit.

II. ISAM Interface.

IICB. ISAM interface control block.

ILE. See *Index link entry.*

IMF. Index management facility.

IMWA. Index modification work area.

inactive configuration. A configuration in an SCDS that SMS is not currently using.

index control entry (ICE). The first entry of each index of the CVOL catalog. This entry contains all control information about the index.

index entry. A catalog entry that describes the index component of a key-sequenced cluster, alternate index, or catalog. An index entry contains the index component's attributes, passwords, protection attributes, allocation and extent information, and statistics.

index link entry (ILE). The last entry of each block of the CVOL catalog, used to link blocks of one index together in a chain.

index pointer entry (IPE). A CVOL catalog entry that attaches a lower-level index to the index in which it is found.

indexed VTOC. A volume table of contents with an index that contains a list of data set names and free space information, which allows data sets to be located more efficiently.

Info/System. An interactive retrieval program product designed for use with the companion database feature Info/MVS.

INITIAL. A physical volume status indicating that some data sets on a given volume lack an associated storage class or are not cataloged in a catalog.

in-place conversion. The process of bringing a volume and the data sets it contains under the control of SMS without data movement, using DFSMSdss.

Interactive Storage Management Facility (ISMF). The interactive interface of DFSMS that allows users and storage administrators access to the storage management functions.

Interactive System Productivity Facility (ISPF). An IBM licensed program used to develop, test, and run application programs interactively. ISPF is the interactive interface for all storage management functions.

invalid. A status indicating that an SCDS or ACDS is in error. Either the SCDS is incomplete, or an ACS routine in the SCDS has assigned an undefined SMS class name or assigned a storage group list that contains undefined names. An invalid SCDS cannot be activated.

IOB. Input/output block.

IOB buffer queue. A queue containing the addresses of IOBs for requests for which a buffer is not available. The BCB contains the addresses of the first and last IOB in this chain, and the IOBDQPTR field in each IOB in the chain contains the address of the next IOB. This queue is used only when real storage is specified for a task.

IOGEN. I/O device generation.

IOM. I/O management.

IOMB. I/O-management block.

IOMBXN. I/O management block extension.

IOSB. I/O supervisor block.

IPCS. Interactive problem control system.

IPE. See *Index pointer entry.*

IQE. Interrupt queue element.

IRB. Interrupt request block.

IRF. Interrupt recognition flag.

IRG. Interrecord gap.

ISAM interface. A set of routines that allow a processing program coded to use ISAM (indexed sequential access method) to gain access to a VSAM key-sequenced data set.

ISMF. See *Interactive Storage Management Facility.*

ISPF. See *Interactive System Productivity Facility.*

J

JCL. Job control language.

JCT. Job control table.

JESCT. Job entry subsystem control table.

JFCB. Job file control block.

JFCBE. Job file control block extension.

job step catalog. A catalog made available for a job by means of the STEPCAT DD statement.

JSCB. Job step control block.

JSTCB. Job step task control block.

K

K. Kilobyte.

KEQ. Search on key equal.

keyword. A symptom that describes one aspect of a program failure.

KSDS. Key-sequenced data set.

L

L. Link.

LCS. Library control system

LD. Label definition.

LDS. See *Linear data set.*

linear data set (LDS). A VSAM data set that contains data but no control information. A linear data set can be accessed as a byte-addressable string in virtual storage.

LINK. An Assembler language macro instruction that causes control to be passed to a specified entry point. The linkage relationship established is the same as that created by a BAL instruction.

list application. An ISMF application that lists and manages lists saved from various other ISMF applications.

LLE. Load list element.

LLOR. Least length of record (that contains all key fields).

load module buffer. An area of virtual storage used by the linkage editor to read input load module text records and possibly to retain the text information in storage for subsequent writing of the output load module text records.

local storage. Virtual storage in a user's private address space.

locate. Pertains to functions that do not change the status of a catalog; that is, read-only operations are performed.

LPA. Link pack area.

LPALIB. Link pack area library.

LPMB. Logical-to-physical mapping block.

LR. Label reference.

LRI. Logical record interface.

LSQA. Local system queue area.

M

MACR. Macro reference.

management class. A collection of management attributes, defined by the storage administrator, used to control the release of allocated but unused space; to control the retention, migration, and backup of data sets; to control the retention and backup of aggregate groups, and to control the retention, backup, and class transition of objects.

manual tape library. Installation-defined set of tape drives defined as a logical unit together with the set of system-managed volumes which can be mounted on the drives.

master catalog. A catalog that contains extensive data set and volume information that VSAM requires to locate data sets, to allocate and deallocate storage space, to verify the authorization of a program or operator for accessing a data set, and to accumulate usage statistics for data sets.

MBBCCHHR. Module#, bin#, cylinder#, head#, record#.

MBCB. Main SVRB pool control block.

memory. As used in this book, a synonym for the private address space in virtual storage.

migration. The process of moving unused data to lower cost storage in order to make space for high-availability data. If you wish to use the data set, it must be recalled. See also *migration level 1, migration level 2*.

migration level 1. DFSMShsm-owned DASD volumes that contain data sets migrated from primary storage volumes. The data can be compressed. See also *storage hierarchy*. Contrast with *primary storage, migration level 2*.

migration level 2. DFSMShsm-owned tape or DASD volumes that contain data sets migrated from primary storage volumes or from migration level 1 volumes. The data can be compressed. See also *storage hierarchy*. Contrast with *primary storage, migration level 1*.

ML1. Migration level 1 volume.

ML2. Migration level 2 volume.

MLA. Multilevel alias facility.

MLPA. See *Modified link pack area.*

MMIB. Media manager interface block.

MMPB. Media manager process block.

MMPT. Media manager purge table.

MMRE. Media manager request element.

MMSB. Media manager storage block.

MMSV. Media manager storage vector.

MMVT. Media manager vector table.

MOD. Module.

MODESET. A Supervisor macro instruction used to change the system status by altering the PSW key or the mode indicator.

modified link pack area (MLPA). An area of virtual storage containing reenterable routines from the SYS1.LINKLIB, SYS1.SVCLIB, or SYS1.LPALIB system data sets that are to be part of the pageable extension of the link pack area during the current IPL.

modifier keyword. Refers to the type of keywords used to restrict the scope of a software database search to a reasonable number of matches of unique failure characteristics.

must-complete. An indication to the operating system that the event must be performed without interruption or waiting.

MVS. Multiple virtual storage.

MVS configuration program (MVSCP). A single-step, batch program that defines the input/output configuration to z/OS.

MVS configuration program (MVSCP). A single-step, batch program that is used to define input/output configurations to z/OS.

MVS/ESA. Multiple Virtual Storage/Enterprise Systems Architecture. A z/OS operating system environment that supports ESA/390.

MVS/ESA SP. An IBM licensed program used to control the z/OS operating system. MVS/ESA SP together with DFSMS compose the base MVS/ESA operating environment. See also *z/OS*.

MVS/XA™. A z/OS operating system environment that supports 31-bit real and virtual storage addressing, increasing the size of addressable real and virtual storage from 16 MB to 2 GB.

MVS/370. A z/OS operating system environment that supports 24-bit real and virtual storage addressing.

N

n. Integer number.

next address feedback. A user-specified option that causes the system to put the relative address (TTR) of the next data or capacity record into the area specified in the next address operand of the READ or WRITE macro. (If the type operand in the READ or WRITE macro terminated with an R, the address of the next data record is returned; if it terminated with an RU, the address of the next data or capacity record is returned, whichever occurs first.) Next address feedback is only applicable for operations involving format VS records.

nonlocate. Pertains to functions that change the status of a catalog; that is, write operations are performed.

non-SMS volume. A volume that is not controlled by SMS.

non-VSAM entry. A catalog entry that describes a non-VSAM data set. A non-VSAM entry contains the data set's volume serial number and device type. If the data set resides on a magnetic tape volume, the entry can also identify the data set's file number. When the data set resides on a direct-access device, the operating system obtains further information by examining the data set's DSCB (data set control block) in the volume's VTOC (volume table of contents).

non-VSAM volume record (NVR). A VVDS record that contains SMS-related information about a non-VSAM, system-managed data set.

not connected (NOTCON). Relationship that indicates a system is defined but has no access to a VIO storage group, a pool storage group, or individual volumes within a pool storage group.

NRZI. Nonreturn-to-zero inverted.

NSI. Next sequential instruction.

NSL. Nonstandard label (a label option for magnetic tape devices).

NSP. Next string position.

NUP. No update.

NVR. See *Non-VSAM volume record.*

O

O. Open.

OAM. See *Object access method.*

object. A named byte stream having no specific format or record orientation.

object access method (OAM). An access method that provides storage, retrieval, and storage hierarchy management for objects and provides storage and retrieval management for tape volumes contained in system-managed libraries.

object backup storage group. A type of storage group that contains optical or tape volumes used for backup copies of objects. See also *storage group*.

object code only (OCO). Licensed programs for which source materials are not made available to licensees.

object storage group. A type of storage group that contains objects on DASD, tape, or optical volumes. See also *storage group*.

object storage hierarchy. A hierarchy consisting of objects stored in DB2 table spaces on DASD, on optical or tape volumes that reside in a library, and on optical or tape volumes that reside on a shelf. See also *storage hierarchy.*

O/C/EOV. OPEN/CLOSE/End-of-Volume.

OCO. See *Object code only.*

OFLG. Open flags.

OpenEdition MVS. See *z/OS UNIX System Services.*

OPSW. Old program status word (PSW).

OPTCD. Option code.

optical volume. Storage space on an optical disk, identified by a volume label. See also *volume*.

optimal block size. For non-VSAM data sets, optimal block size represents the block size that would result in the greatest space utilization on a device, taking into consideration record length and device characteristics.

optimal CI size. For VSAM data sets, optimal CI size represents the control interval size that would result in the greatest space utilization on a device.

OPW. Open work area (VSAM—mapped by IDAOPWRK).

OPWA. Common O/C/EOV work area.

OPWRK. VSAM O/C/EOV ACB work area (mapped by IDAOPWRK).

OS control volume (OS CVOL). A volume that contains one or more indexes of the catalog.

OS CVOL. See *Operating system control volume.*

OSMC. Object access method storage management component

OSR. Object storage and retrieval

OS/VS2 MVS. An OS/390® operating system that was the predecessor to MVS/XA.

OTIS. Object access method thread isolation support

OVTOC. Optical volume table of contents

P

P pointer. Position pointer.

pageable link pack area (PLPA). An area of virtual storage containing SVC routines, access methods, and other read-only system and user programs that can be shared among the users of a system.

page space. A system data set that contains pages of virtual storage. The pages are stored into and retrieved from the page space by the auxiliary storage manager.

partitioned data set (PDS). A data set on direct access storage that is divided into partitions, called members, each of which can contain a program, part of a program, or data.

partitioned data set extended (PDSE). A system-managed data set that contains an indexed directory and members that are similar to the directory and members of partitioned data sets. A PDSE can be used instead of a partitioned data set.

PC. Private code.

PCB. Page control block.

PCCB. Private catalog control block.

PCI. Program-controlled interruption.

PCTT. Private catalog termination table.

PDA. See *Problem determination area.*

PDAB. Parallel data access block.

PDSCB. Partial data set control block.

PDS directory. A set of records in a partitioned data set (PDS) used to relate member names to their locations on a DASD volume.

PDSE. See *Partitioned data set extended.*

PE. Phase encoded.

PERFM. Type-of-failure keyword for performance problem.

performance. (1) (1) A measurement of the amount of work a product can produce with a given amount of resources. (2) (2) In a system-managed storage environment, a measurement of effective data processing speed with respect to objectives set by the storage administrator. Performance is largely determined by throughput, response time, and system availability.

PFL. Page fix list.

PFPL. PGFIX parameter list (same as PFL).

physical volume status. Relationship between a pool storage group and each of its individual volumes, indicating if all data sets on a given volume have an associated storage class and are cataloged in a catalog.

PIOD. Problem-state I/O driver.

PIRL. Purge I/O restore list.

plaintext. A data set or key that is not enciphered (with the cryptographic option). A data set or key is plaintext before it is enciphered and after it is deciphered.

PLH. Placeholder list.

PLPA. See *Pageable link pack area.*

PO. Partitioned organization.

pool storage group. A type of storage group that contains system-managed DASD volumes. Pool storage groups allow groups of volumes to be managed as a single entity. See also *storage group*.

PPIR. Problem program storage image record.

PQE. Partition queue element.

PR. Pseudo register.

PRB. Program request block.

primary storage. A DASD volume available to users for data allocation. The volumes in primary storage are called primary volumes. See also *storage hierarchy*. Contrast with *migration level 1, migration level 2*.

problem determination area (PDA). An area provided by the calling program and filled in with diagnostic information by the service.

PROC. Procedure.

program management. The task of preparing programs for execution, storing the programs, load modules, or program objects in program libraries, and executing them on the operating system.

program object. All or part of a computer program in a form suitable for loading into virtual storage for execution. Program objects are stored in PDSE program libraries and have fewer restrictions than load modules. Program objects are produced by the binder.

Program Temporary Fix (PTF). A temporary solution to a software problem reported in an APAR. PTFs are placed on a magnetic tape, or PUT tape, which is distributed to customers.

Program Update Tape (Put Tape). A magnetic tape that includes a collection of PTFs distributed to customers to upgrade their system software.

PS. Physical sequential organization (used to describe data set format).

PSA. Prefixed save area.

PSB. Protected sphere block.

PSL. Page save list.

PSW. Program status word

PTF. See *Program temporary fix.*

PUT tape. program update tape

PVT. Page vector table.

Q

QCB. Queue control block.

QDB. Queue descriptor block.

quiesce all (QUIALL). Relationship that prevents a system from scheduling jobs that allocate or access data sets in a VIO storage group, a pool storage group, or individual volumes within a pool storage group.

quiesce new (QUINEW). Relationship that prevents a system from scheduling jobs that allocate new data sets or modify existing ones in a VIO storage group, a pool storage group, or individual volumes within a pool storage group.

R

R0. Record zero.

RA. Record area.

RAB. Record area block.

RACF. Resource Access Control Facility.

RACF always call. A term for the procedure used by DFSMSdfp to check all data sets automatically for discrete or generic RACF (a component of the Security Server for z/OS) profiles to verify access authority.

RACF authorization. (1) The facility for checking a user's level of access to a resource against the user's desired level of access. (2) The result of that check.

RB. Request block.

RDF. See *Record definition field.*

RDW. Record descriptor word.

READ-exclusive request. A READ request specifying that exclusive control should be acquired for the record about to be read.

read-only variable. An ACS language variable that contains data set or system-derived information. It can be referenced but not altered in an ACS routine.

read-write variable. An ACS language variable that is assigned a value within an ACS routine. It can be referenced, and each ACS routine assigns a value to its own unique read-write variable.

record definition field (RDF). A field stored as part of a stored record segment; it contains the control information required to manage stored record segments within a control interval.

recovery. The process of rebuilding data after it has been damaged or destroyed, often by using a backup copy of the data or by reapplying transactions recorded in a log.

relative block address. A 3-byte binary number that indicates the position of a block in relation to the first block of a data set. The first block of a data set always has a relative block address of 0.

relative extent. An area in the DEB containing the number of blocks in each extent and the number of blocks in each track (if track overflow is not in effect) of a data set. Module IGG0193A builds the relative extent area when relative block addressing is specified in the processing program.

relative record data set (RRDS). A VSAM data set whose records are loaded into fixed-length slots.

relative track address. A 3-byte binary number in the form TTR:

TT is the position of the track relative to the first track of a data set. The first track has a relative position of 0.

R is the number of the block relative to the first block on the track TT. The first block of data on a track has a relative value of 1.

residence mode (RMODE). The attribute of a load module that identifies where in virtual storage the program will reside (above or below 16 megabytes).

Resource Access Control Facility (RACF). An IBM licensed program that is included in z/OS Security Server and is also available as a separate program for the z/OS and VM environments. RACF provides access control by identifying and verifying the users to the system, authorizing access to protected resources, logging detected unauthorized attempts to enter the system, and logging detected accesses to protected resources.

Resource Measurement Facility (RMF). An IBM licensed program or optional element of z/OS, that measures selected areas of system activity and presents the data collected in the format of printed reports, system management facilities (SMF) records, or display reports. Use RMF to evaluate system performance and identify reasons for performance problems.

RETAIN. A software system used by support centers and other IBM offices to solve the problems that are found in IBM products. RETAIN documents reported problems and the corrections that are being developed for these problems.

RETURN. An Assembler language macro instruction that is used to return control to the calling CSECT, and to signal normal termination of the returning CSECT.

RIM. Resource initialization module.

ripple. Moving data from one block of a chain to the next, because of modification of data in a preceding block.

RLS. record-level sharing.

R/M. Record management.

RMF™. See *Resource Measurement Facility.*

RMID. Replace module identifier (used by SMP and SMP/E).

RMODE. See *Residence mode.*

Rn. General-purpose register n.

RPL. Request parameter list.

RPLE. Request parameter list extension.

RPG. Report Program Generator.

RPS. Rotational position sensing.

RRDS. See *Relative record data set.*

RRN. Relative record number.

RSECT. Read-only control section.

RTM. Recovery/termination manager.

RTN. Routine.

S

SAF. System authorization facility.

SAM. Sequential access method.

SAMB. Sequential access method block.

SAVE. An Assembler language macro instruction that causes the contents of the specified registers to be stored in the save area at the address contained in register 13.

SCB. STAE control block.

SCDS. See *Source control data set.*

SCIB. Search compressed index block.

SCRA. Catalog recovery area in system storage.

SCRATCH. An Assembler language macro instruction that points to the CAMLST macro instruction. SCRATCH, the first operand of CAMLST, specifies that a data set be deleted.

SCT. Step control table.

SCVT. Secondary communication vector table.

SD. Section definition.

SDB. See *Structured database.*

SDW. Segment descriptor word.

SDWA. System diagnostic work area.

SE. System engineer

search argument. The field of a data block that contains information identifying the block as unique from any other block in the data set. Can be either the key field or the block ID in the count field. This term is also used to describe the string of keywords containing software failure symptom keywords.

search limit. The track following the last track that should actually be searched in a data set. The search limit is calculated and put in the IOBUPLIM field of the IOB when the DCB specifies the extended search option.

self-format channel program. A channel program that writes a new format U, V, or VS record to an already existing data set.

SEQ. Sequential or sequential processing.

sequential data striping. A software implementation of a disk array that distributes data sets across multiple volumes to improve performance.

service request block (SRB). A system control block used for dispatching tasks.

shelf. A place for storing removable media, such as tape and optical volumes, when they are not being written to or read.

simple name. The rightmost component of a qualified name. For example, APPLE is the simple name in TREE.FRUIT.APPLE. The simple name corresponds to the lowest index level in the CVOL catalog for the data set name.

SIO. Start I/O.

SIO appendage. Start I/O appendage.

SIOD. Supervisor-state I/O driver.

SIOT. Step I/O table.

SIRB. Supervisor interrupt request block.

SKP. Skip sequential processing.

SLIP. Serviceability level indication processing.

slot. For a relative record data set, the data area addressed by a relative record number which may contain a record or be empty.

SMAS. Storage management address space.

SML. Storage Management Library.

SMP/E. System modification program/extended.

SMS. (1) See *Storage Management Subsystem.* (2) System-managed storage.

SMS class. A list of attributes that SMS applies to data sets having similar allocation (data class), performance (storage class), or backup and retention (management class) needs.

SMS complex. A collection of systems or system groups that share a common configuration. All systems in an SMS complex share a common active control data set (ACDS) and a communications data set (COMMDS). The systems or system groups that share the configuration are defined to SMS in the SMS base configuration.

SMS configuration. A configuration base, Storage Management Subsystem class, group, library, and drive definitions, and ACS routines that the Storage Management Subsystem uses to manage storage. See also *configuration, base configuration, source control data set* .

SMS service level. A set of logical characteristics of storage required by a system-managed data set (for example, performance, security availability).

SMS volume. See CONVERTED.

Software Support Facility. An IBM online database that contains information about all current APARs (authorized program analysis reports) and PTFs (program temporary fixes).

source catalog. An existing catalog that can be exported into a target catalog.

source control data set (SCDS). A VSAM linear data set containing an SMS configuration. The SMS configuration in an SCDS can be changed and validated using ISMF. See also *active control data set, communications data set*.

sphere. The collection of base cluster, alternate indexes, and upgrade alternate indexes opened to process one or more paths related to the same base information block (BIB).

sphere record. A collection of logically related subrecords in one VSAM logical record.

SPL. Service priority list.

SPQE. Subpool queue element.

step catalog. See job step catalog.

SQA. System queue area.

SQL. Structured query language

SRA. Sphere record area.

SRB. See *Service request block.*

SSCR. Subsystem checkpoint record.

SSF. Software Support Facility.

SSIB. Subsystem identification block.

SSL. (1) Swap save list. (2) Storage Subsystem Library.

SSOB. Subsystem option block.

SST. Set sector table.

STC. System task control.

STCB. Subtask control block.

storage administrator. A person in the data processing center who is responsible for defining, implementing, and maintaining storage management policies.

storage class. A collection of storage attributes that identify performance goals and availability requirements, defined by the storage administrator, used to select a device that can meet those goals and requirements.

storage group. A collection of storage volumes and attributes, defined by the storage administrator. The collections can be a group of DASD volumes or tape volumes, or a group of DASD, optical, or tape volumes treated as a single object storage hierarchy. See also *VIO storage group, pool storage group, tape storage group, object storage group, object backup storage group, dummy storage group*.

storage hierarchy. An arrangement of storage devices with different speeds and capacities. The levels of the storage hierarchy include main storage (memory, DASD cache), primary storage (DASD containing uncompressed data), migration level 1 (DASD containing data in a space-saving format), and migration level 2 (tape cartridges containing data in a space-saving format). See also *primary storage, migration level 1, migration level 2, object storage hierarchy*.

storage location. A location physically separate from the removable media library where volumes are stored for disaster recovery, backup, and vital records management.

storage management. The activities of data set allocation, placement, monitoring, migration, backup, recall, recovery, and deletion. These can be done either manually or by using automated processes. The Storage Management Subsystem automates these processes for you, while optimizing storage resources. See also *Storage Management Subsystem*.

storage management complex. The set of systems within an installation running intercommunicating copies of SMS.

Storage Management Subsystem (SMS). A DFSMS facility used to automate and centralize the

management of storage. Using SMS, a storage administrator describes data allocation characteristics, performance and availability goals, backup and retention requirements, and storage requirements to the system through data class, storage class, management class, storage group, and ACS routine definitions.

stripe. In DFSMS, the portion of a striped data set, such as an extended format data set, that resides on one volume. The records in that portion are not always logically consecutive. The system distributes records among the stripes such that the volumes can be read from or written to simultaneously to gain better performance. Whether it is striped is not apparent to the application program.

striping. A software implementation of a disk array that distributes a data set across multiple volumes to improve performance.

STRNO. Number of RPL strings.

structured database (SDB). A facility of the IBM RETAIN system that permits searching the software support database with a system-generated string of closely defined symptom keywords built from user-entered data.

subrecord. The user definition level of a sphere, such as an alternate index, cluster, or generation data set.

subroutine identification. The 2 low-order bytes of each module's unique 8-byte name.

SUR. Supervisor record.

SVC. Supervisor call instruction.

SVCLIB. Supervisor call library.

SVRB. Supervisor request block.

SVT. Supervisor vector table.

SWA. (1) Segment work area. (2) Scheduler work area.

synchronization time interval. The number of seconds that SMS allows before it checks COMMDS for volume status, space statistics, and configuration changes from other systems in the complex.

SYSCTLG. The data set name of the CVOL catalog.

SYSDUMP. System dump.

system-managed data set. A data set that has been assigned a storage class.

system-managed storage. Storage managed by the Storage Management Subsystem. SMS attempts to deliver required services for availability, performance, and space to applications. See also *system-managed storage environment*.

DFSMS environment. An environment that helps automate and centralize the management of storage. This is achieved through a combination of hardware, software, and policies. In the DFSMS environment for MVS, this function is provided by DFSMS, DFSORT, and RACF. See also *system-managed storage*.

system-managed tape library. A collection of tape volumes and tape devices, defined in the tape configuration database. A system-managed tape library can be automated or manual. See also *tape library.*

system-managed volume. A DASD, optical, or tape volume that belongs to a storage group. Contrast with *DFSMShsm-managed volume, DFSMSrmm-managed volume*.

system management facilities (SMF). A component of z/OS that collects input/output (I/O) statistics, provided at the data set and storage class levels, which helps you monitor the performance of the direct access storage subsystem.

system programmer. A programmer who plans, generates, maintains, extends, and controls the use of an operating system and applications with the aim of improving overall productivity of an installation.

T

tape library. A set of equipment and facilities that support an installation's tape environment. This can include tape storage racks, a set of tape drives, and a set of related tape volumes mounted on those drives. See also *system-managed tape library*.

tape mount management. The methodology used to optimize tape subsystem operation and use, consisting of hardware and software facilities used to manage tape data efficiently.

tape storage group. A type of storage group that contains system-managed private tape volumes. The tape storage group definition specifies the system-managed tape libraries that can contain tape volumes. See also *storage group*.

tape volume. A tape volume is the recording space on a single tape cartridge or reel. See also *volume*.

target catalog. The catalog into which a data set or a source catalog is imported by access method services.

task control block (TCB). Holds control information related to a task.

TCB. See *Task control block.*

TIOT. Task I/O table.

TMM. See *Tape mount management.*

TMP. Terminal monitor program.

TQE. Timer queue element.

track overflow. A user-specified option that will allow a format F record whose space requirements exceed the space remaining on the track to be partially written on that track and completed on the next track.

tracks unused. For data sets specifying cylinder allocation, tracks unused represents the number of unused tracks (returned in kilobytes) over all cylinders allocated.

transaction ID. A number associated with each of several request parameter lists that define requests belonging to the same data transaction.

TRC. Table reference character.

true name. (1) In a CVOL catalog, the high-level qualifier to which an alias is related. (2) Refers to the names generated for the data and index components as a result of the DEFINE command.

TSO/E. Time sharing option.

type-of-failure keyword. Refers to the type of keywords used to identify an external symptom of a program failure.

U

U. Undefined (used to describe record format).

UCB. See *Unit control block.*

UCRA. Catalog recovery area in user's storage.

UCS. Universal character set.

UHL. User header label.

uncatalog. To remove the catalog entry of a data set from a catalog.

unit control block (UCB). A control block in storage that describes the characteristics of a particular I/O device on the operating system.

unposted queue. A queue of IOBs that are waiting to get exclusive control of a resource currently under exclusive control. The unposted queue contains only IOBs for the current task.

unscheduled list. An area of virtual storage containing the addresses of IOBs for requests for which a buffer is not available. It is used only when virtual storage is specified for a task.

UPD. Update mode.

update channel program. A channel program that reads or writes data for purposes other than adding a new block to an existing data set.

update number. For a spanned record, a binary number in the second RDF of a record segment that indicates how many times the segments of a spanned record should be equal. An inequality indicates a possible error.

UPT. Upgrade table.

USAR. User security authorization record.

USASI. USA Standards Institute (now called American National Standards Institute).

user buffering. The use of a work area in the processing program's address space for an I/O buffer; VSAM transmits the contents of a control interval between the work area and direct access storage without intermediary buffering.

user catalog. An optional catalog used in the same way as the master catalog and pointed to by the master catalog. A user catalog lessens contention for the master catalog and facilitates volume portability.

user catalog connector. See catalog connector.

USL. Unscheduled list.

USVR. User security-verification routine.

UTL. User trailer label.

V

V. Variable (used to describe record format).

valid. A status indicating that an SCDS or ACDS is complete. The ACS routines only assign SMS class names and lists of storage group names that are defined to the SCDS. To be complete, an SCDS must contain at least one storage class definition, at least one pool storage group definition

validate. To check the completeness and consistency of an individual ACS routine or an entire SMS configuration.

VAT. Valid AMBL table.

VCB. See *Volume control block.*

VCBPE. See *Volume control block pointer entry.*

VCON. V-type constant.

VCRCORE. VSAM checkpoint/restart core.

VCRT. VSAM checkpoint/restart table.

VDSCB. Virtual data set control block.

VDSS. VTOC data set services.

vertical extension. An extension record pointed to by a set-of-fields pointer in the object's base catalog record or its horizontal extension. See also base catalog record and horizontal extension.

VGTT. VSAM global termination table.

VIB. VTOC information block.

VICE. See *Volume index control entry.*

VIER. VTOC index entry record.

VIO. Virtual input output.

VIOT. Valid IOMB table.

VIO storage group. A type of storage group that allocates data sets to paging storage, which simulates the activity of a DASD volume. VIO storage groups do not contain any actual DASD volumes.

VIR. VTOC index record.

virtual storage constraint relief (VSCR). The use of extended areas in virtual storage to store system programs, buffers, and control blocks, leaving more space below 16 megabytes for user programs.

vital record specification. Policies defined to manage the retention and movement of data sets and volumes for disaster recovery and vital records purposes.

VIXM. VTOC index map.

VLSPC. Volume space table.

VMDS. VTOC map of DSCBs.

VMT. Volume mount table.

volume. The storage space on DASD, tape, or optical devices, which is identified by a volume label. See also *DASD volume, optical volume, tape volume*.

volume application. Using a list of volumes constructed by ISMF, you can perform tasks against an individual volume. These tasks include consolidating or recovering unused space, copying, backing up, and restoring volumes.

volume cleanup. The process of deleting all VSAM data spaces from a volume and removing a catalog's ownership of a volume, even though the volume contains VSAM data records.

volume control block (VCB). A block of the catalog that identifies as many as 20 volumes containing one data set.

volume control block pointer entry (VCBPE). A CVOL catalog entry that identifies a VCB for a named data set.

volume index. The highest level of index in the CVOL catalog structure. Entries in the volume index point to all lower indexes and simple names.

volume index control entry (VICE). The first entry in the volume index. The VICE describes the volume index and controls space allocation in SYSCTLG.

volume mount analyzer. A program that helps you analyze your current tape environment. With tape mount management, you can identify data sets that can be redirected to the DASD buffer for management using SMS facilities.

volume pooling. Grouping volumes and managing them as if they were a single, large volume rather than managing them on an individual basis.

VPL. Virtual page list.

VPSM. VTOC pack space map.

VRF. VTOC recording facility.

VRP. VSAM resource pool.

VSAM. Virtual storage access method.

VSAM record-level sharing (VSAM RLS). An extension to VSAM that provides direct record-level sharing of VSAM data sets from multiple address spaces across multiple systems. Record-level sharing uses the z/OS Coupling Facility to provide cross-system locking, local buffer invalidation, and cross-system data caching.

VSAM shared information (VSI). Blocks that are used for cross-system sharing.

VSAM volume control record (VVCR). The first logical record in the VVDS that contains information to manage DASD space and the BCS back pointers.

VSAM volume data set (VVDS). A data set that describes the characteristics of VSAM and system-managed data sets residing on a given DASD volume; part of an integrated catalog facility catalog. See also *basic catalog structure, integrated catalog facility catalog*.

VSAM volume record (VVR). The VSAM volume record is a VSAM logical record within a VVDS.

VSCR. Virtual storage constraint relief.

VSI. See *VSAM shared information.*

VSL. Virtual subarea list.

VSM. Virtual storage manager.

VSRT. VSAM shared resource table.

VTOC. Volume table of contents.

VVCR. See *VSAM volume control record.*

VVDS. VSAM volume data set.

VVDSWA. VVDS work area.

VVR. See *VSAM volume record.*

W

WAIT. An Assembler language macro instruction that informs the control program that the issuing program cannot continue until a specific event, represented by an event control block, has occurred.

WAX. Work area for path processing.

where-to-go table (WTG). The name of a table used to transfer control between common O/C/EOV modules.

WRITE-add request. A request to write a new block to the data set.

WRITE-release request. A WRITE-update request that specifies exclusive control should be released for the record about to be written.

WRITE-update request. A request to write an already existing block to the data set.

write-validity check. A user-specified option that causes the system to verify the accuracy of any data written by the channel program.

WSHD. Working storage header.

WTG. See *Where-to-go table.*

WXTRN. Weak external reference.

X

XA. Extended architecture.

XCTL. Transfer control (an Assembler language macro).

XCTL (transfer control). An Assembler language macro that causes control to be passed to a specified entry point.

XDAP. Execute direct access program.

XLRI. Extended logical record interface.

XPT. Checkpoint.

XPTE. External page table entry.

XREF. Cross reference.

XSB. Extended status block.

XTRN. External reference.

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